

## PATENT

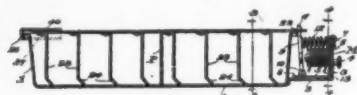
Issued May 7, 1935

2,000,005. CONTINUOUS ABSORPTION REFRIGERATION. Edmund Altenkirch, Neuenhagen, near Berlin, Germany, assignor to The Hoyer Co., North Canton, Ohio, a corporation of Ohio. Original application Nov. 2, 1929. Serial No. 410,020. Divided and reapplication Oct. 6, 1933. Serial No. 627,473. In Germany Nov. 30, 1928. 9 Claims. (Cl. 62-119.5.)

2. In a continuous absorption refrigerating system, the combination with an absorber, a boiler and means for circulating absorption liquid therebetween, of means for lowering the concentration of the absorption liquid as it passes from the boiler to the absorber and for raising the concentration of the absorption liquid as it passes from the absorber back to the boiler, said means comprising an auxiliary boiler, an auxiliary absorber and means for circulating inert gas between the auxiliary boiler and the auxiliary absorber to transfer refrigerant from the auxiliary boiler to the auxiliary absorber.

2,000,021. ICE CREAM FREEZER. Charles T. Hoffman and Emory L. Groff, as trustee. Application Nov. 7, 1930. Serial No. 494,154. 12 Claims. (Cl. 259-113.)

1. An ice cream freezer adapted to be placed in a refrigerator compartment including a container adapted to be inserted



2,000,021

in and removed from said compartment, an electro-mechanical actuator carried by the container, actuating means within the container operatively connected with said actuator, a constant source of electrical current, means for changing said current from the constant source to an intermittent current, and an electrical connection between said electro-mechanical actuator and said means for changing the constant current to intermittent current.

2,000,022. ICE CREAM FREEZER. Charles Thomas Hoffman, Washington, D. C., assignor, by direct and mesne assignments, to Emory L. Groff, as trustee. Application July 22, 1931. Serial No. 552,503. 20 Claims. (Cl. 62-116.)

1. An ice cream freezer including a freezing pan, dasher means therein, and a synchronous motor for operating said dasher means, said synchronous motor including an electro-magnet comprising a relatively fixed part and a detachable part carried by the pan, the rotor of the motor also being carried by the pan.

2,000,023. ICE CREAM FREEZER FOR REFRIGERATORS. Charles T. Hoffman, Washington, D. C., assignor by direct and mesne assignments, to Emory L. Groff, as trustee. Application July 11, 1932. Serial No. 621,988. 16 Claims. (Cl. 62-116.)

In a refrigerator having an evaporator provided with pan compartments, a face plate for the evaporator, electromagnets fitted to the face plate at a pan compartment location of the evaporator, a pan for the mixture to be frozen adapted to be inserted in one of said compartments, a rotor and divided pole pieces carried by said pan, said pole pieces being adapted to contact with the electromagnets.

2,000,356. HUMIDIFIER. Ferris N. Smith,

Grand Rapids, Mich. Application April 2, 1934. Serial No. 718,690. 28 Claims. (Cl. 122-451.1)

16. In a structure of the class described, the combination of a boiler, an inlet valve, a thermostatic element adjustably associated with said inlet valve, and a second thermostatic element mounted at the inner end thereof with respect to said inlet valve, said thermostatic elements having a connection at their outer ends, the second thermostatic element having a relatively low coefficient of expansion and being subject to the incoming water whereby it contracts in advance of the contraction of the coacting thermostatic element.

2,000,398. THERMOSTATIC SWITCH. Clarence R. Laubenfels, Burlington, Iowa. Application July 5, 1932. Serial No. 620,849. 9 Claims. (Cl. 200-138.)

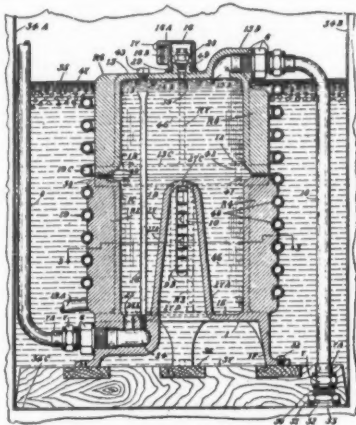
1. In a device of the class described, a base, a thermostatic strip supported thereon, yieldable means for applying longitudinal pressure to said strip to normally retain the strip in either of two oppositely arched conditions and to permit the ends of the strip to separate as it moves from one of its arched conditions to the other to temperature changes, and adjustable means for imparting a transverse bending strain to a portion of said strip to change the tendency of said strip to assume one of said curved conditions.

2,000,440. REFRIGERATING APPARATUS. Howard L. Forman, Kitchawan, N. Y. Application Dec. 23, 1933. Serial No. 703,714. 17 Claims. (Cl. 62-104.)

1. A refrigerator for perishable products having refrigerating means for cooling and circulating the air within it, means for admitting liquid, sprinkling means for discharging such liquid in a shower over such products, and means associated with said refrigerating means for cooling such liquid in transit and before it reaches the showering means to a temperature slightly above the freezing point, whereby to avoid freezing such products.

2,000,446. LIQUID CHILLING APPARATUS. Thomas Alfred Jenkins, Roselle, N. J. Application Oct. 24, 1933. Serial No. 694,954. 3 Claims. (Cl. 62-141.)

1. In an apparatus of the type described, a liquid chilling tank, composed of a bottom unit, having formed integral thereto,



2,000,446

at the base, a hollow protuberant structure, with a plurality of hollow ribs, connecting said hollow protuberant structure, to adjoining wall of chilling tank, to increase heat conducting surface and effect rapid transfer of heat from liquids in chilling tank, to a liquid refrigerant, in contact with exterior surfaces of chilling tank, a top unit, forming a component part of chilling tank.

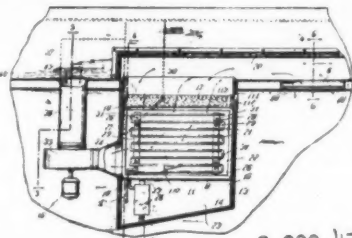
2,000,467. COOLING, FREEZING AND HEATING APPARATUS. Theodore Lindseth, Coronado, Calif. Application Sept. 9,

1931. Serial No. 561,841. 3 Claims. (Cl. 257-8.)

1. In a cooling, freezing and heating apparatus, an air circulating system including a chamber, an air conduit connected therewith, and fan means for maintaining circulation of air through said conduit and chamber, a portion of said conduit arranged in a coil, a tank for receiving said coil, a temperature transmitting medium contained in said tank in direct contact with said coil and immersing the same, freezing coils positioned and arranged both inside and outside of the coil in said conduit and immersed in said temperature transmitting medium, a heating medium positioned in alignment with and below the coil in said conduit with the temperature transmitting medium in said tank, said freezing coils forming guide means for directing the temperature transmitting mediums as heated around said conduit coil.

2,000,477. COOLING AND VENTILATING SYSTEM. Edward F. Carry, Chicago, Ill.; Mabel D. Carry, executrix of the estate of said Edward F. Carry, deceased, assignor to Pullman-Standard Car Mfg. Co., a corporation of Delaware. Application Nov. 14, 1927. Serial No. 233,101. 11 Claims. (Cl. 62-117.)

1. In a railway passenger car, the combination with upper deck framing including transverse and connecting longitudinal



2,000,477

members, of ceiling, wall, and removable floor panels suspended from certain of said longitudinals and defining an air chamber above the space normally devoted to service and accommodation requirements and divided into compartments, a cooling coil in one of said compartments supported independently of adjacent floor panels, a mechanical refrigerating apparatus suspended beneath the car and having fluid connection with said cooling coil, and valve means in another of said compartments controlling the supply of refrigerant from said apparatus to the cooling coil.

2,000,525. REFRIGERATING SYSTEM. Albert L. Lambert, Philadelphia, Pa., assignor to Helmtz Mfg. Co., a corporation of Pennsylvania. Application Sept. 8, 1932. Serial No. 632,147. 15 Claims. (Cl. 62-101.)

11. In a device of the character described, an insulated compartment, a closed circulating system within and adapted to absorb heat from said compartment, a non-volatile liquid substantially filling said system, an insulated container, a solid refrigerant in said container, and a metallic conductor partly within the container and in heat exchange relation to both said system and said refrigerant.

2,000,590. REFRIGERATING APPARATUS. Herbert George, Dayton, Ohio, assignor, by mesne assignments, to General Motors Corp., a corporation of Delaware. Application April 30, 1929. Serial No. 359,400. 2 Claims. (Cl. 220-9.)

1. A refrigerator cabinet including a framework, a box-like sheet metal food compartment supported by said framework, the framework including frame pieces extending along and beyond the corners of the food compartment to form rectangular recesses on the outer surface of said compartment, a layer of bituminous cement on the outer surface of said food compartment in said recess, a layer of compressed baked rock wool in each of said recesses with its fibres individually sized with asphaltic material, means for hermetically sealing said layers, and an outer metallic casing supported by said framework.

2,000,597. AIR DISTRIBUTION UNIT. Robert E. Keyes, Dedham, Mass., assignor to B. F. Sturtevant Co., Inc., Boston, Mass. Application Jan. 17, 1934. Serial No. 707,000. 9 Claims. (Cl. 257-8.)

1. A combined heating and cooling unit comprising a cold air compartment, an injector nozzle connected with said compartment, a heater below said compartment, an opening in said unit for the reception of recirculated air, a recirculated air passage connecting with said opening, passing through said heater, around said compartment, and in injector relationship past said nozzle, and a second recirculated air passage by-passing said heater and surrounding said first air passage in the area where same passes said compartment.

2,000,691. COMPRESSOR DISCHARGE VALVE. Lester L. Collins, Franklin, Pa., assignor to Chicago Pneumatic Tool Co., New York, N. Y., a corporation of New Jersey. Application April 2, 1931. Serial No. 527,218. 4 Claims. (Cl. 277-60.)

1. A valve assembly comprising a seat member, a plate or disk valve on said member, a keeper secured to said member over said valve and having a series of bores therethrough, springs extending through said bores for yieldingly maintaining said valve in contact with said member, and housing means for said springs mounted in said bores, said valve being movable relatively to said housing means.

2,000,706. AIR CLEANER. Wilfred W. Lowther, Minneapolis, Minn., assignor to Donaldson Co., Inc., St. Paul, Minn., a corporation of Minnesota. Application Dec. 15, 1933. Serial No. 702,482. 14 Claims. (Cl. 183-15.)

1. An air cleaner comprising a casing having an oil well in its bottom and an air outlet in its upper portion, an air intake tube leading axially downward through said casing, a screen in the space within said casing surrounding said air intake tube, and an annular baffle in said oil well spaced from the walls and bottom of said well and from the lower end of said air intake tube, said annular baffle

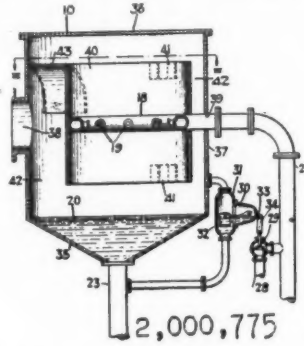
affording a chamber within said oil well that is unobstructed below the intake tube and, at its bottom has free and unobstructed communication with the bottom of said well, said annular baffle being extended to a point considerably above the lower end of said air tube and said screen being extended downward substantially to the upper edge of said annular baffle.

2,000,730. AUTOMATIC FREEZING AND DISPENSING APPARATUS. Edward F. Wortmann, Jersey City, N. J. Application May 9, 1933. Serial No. 670,115. 5 Claims. (Cl. 62-114.)

1. In apparatus of the character set forth: a freezing drum, a displacement cylinder rotatably mounted within the same to provide an intermediate reduced annular and cylindrical mixing space, the periphery of said cylinder being provided with suitable beater and scraper elements longitudinally disposed thereon and displaced circumferentially thereover, means to introduce at one end of the mixing space a mix to be frozen, means to withdraw the congealed mix from an opposite end of the space, means to rotate said cylinder, and cooling means associated with the drum.

2,000,775. REFRIGERATION APPARATUS. John W. McNulty, Ridley Park, Pa., assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., a corporation of Pennsylvania. Application Nov. 4, 1932. Serial No. 641,296. 12 Claims. (Cl. 62-152.)

1. In a refrigerating apparatus, the combination of a spray tank comprising end walls and a tubular wall joining the end



2,000,775

walls: a sleeve-like baffle element arranged within the tank with the axis thereof disposed substantially parallel to the axis of the tubular wall; the baffle element being spaced from the tubular wall of the tank to provide a continuous passage therebetween, and the ends of the baffle being spaced from the end walls of the tank to provide communication between the interior of the baffle and the passage; means disposed within the baffle for spraying liquid refrigerant into the tank; means communicating directly with the passage at a point intermediate the ends of the baffle for effecting a vacuum condition inside of the tank; and means for withdrawing cooled liquid from the tank.

2,000,787. REFRIGERATING APPARATUS. Lawrence A. Philipp, Detroit, Mich., assignor to Kelvinator Corp., Detroit, Mich., a corporation of Michigan. Application June 20, 1932. Serial No. 618,126. 12 Claims. (Cl. 62-116.)

12. A refrigerator comprising in combination, an insulated cabinet having a plurality of compartments separated from one another to prevent the free flow of air therebetween, said cabinet having an opening, a single door for closing said opening, a unitary refrigerating apparatus including two evaporators, one for each compartment, said unitary apparatus also

including a condensing element connected with the evaporators, said apparatus being removable and insertible as a unit through said opening.

2,000,821. MEANS FOR COOLING AND CONDITIONING AIR. Allen W. Clarke and William F. Dietrichson, Berwick, Pa., assignors to American Car and Foundry Co., New York, N. Y., a corporation of New Jersey. Application Oct. 15, 1932. Serial No. 637,906. 7 Claims. (Cl. 62-133.)

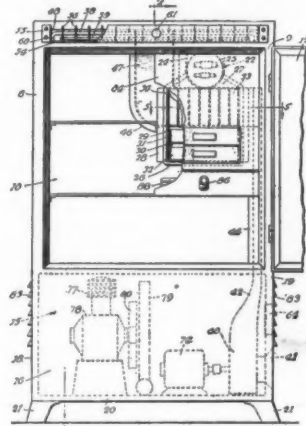
1. In a precooler, a body portion having walls therein forming an ice chamber a reservoir receiving water melting from ice, baffle means in the ice chamber dividing the latter into a plurality of compartments, air inlet and outlet means for said ice chamber, blower means for drawing air through the ice chamber, means constituting at least part of the walls of said ice chamber so formed as to remove suspended moisture from the air, and an air duct in said reservoir receiving air from the ice chamber and having one end discharging outside the body portion.

2,000,841. APPARATUS FOR CONDITIONING AIR. Wallace H. Herdlein, St. Louis, Mo., assignor to American Car and Foundry Co., New York, N. Y., a corporation of New Jersey. Application June 20, 1933. Serial No. 676,701. 9 Claims. (Cl. 257-7.)

8. In an air conditioning apparatus of the character described, in combination, a combined spray chamber and water reservoir in direct communication, an evaporator unit within said reservoir, spray devices within the chamber, means to circulate water from the reservoir to the spray devices, means associated with the spray devices adapted to prevent excessive pressure on the spray devices to thereby insure their proper functioning, and means to draw air through the spray and over the surface of the water in the reservoir.

2,000,879. DOMESTIC REFRIGERATOR. Robert C. Brown, Jr., Evanston, Ill. Application March 21, 1932. Serial No. 600,135. 7 Claims. (Cl. 62-116.)

1. A domestic refrigerator comprising an insulated cabinet having a food chamber therein, a door in a side wall of said



2,000,879

chamber through which access is had to said chamber, a cooling unit associated therewith comprising a header, refrigerant ducts depending from the header and forming an intermediate freezing zone, ice trays supported in the freezing zone, a tortuous air conduit in the freezing zone, and means for forcing air from the exterior of the cabinet through the conduit and discharging it back into the room at a reduced temperature, said conduit preventing its mingling with the air in said compartment.

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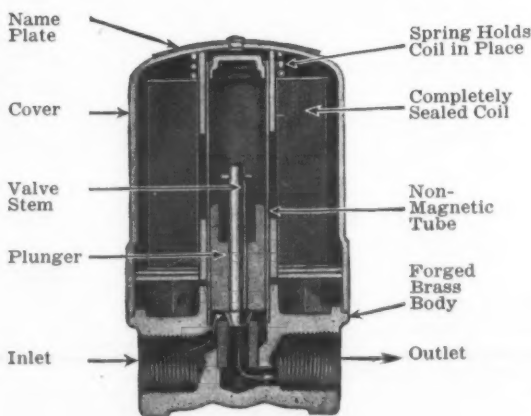


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# REFRIGERATION NEWS

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## Engineers Study Conditioning & New Standards

### Lively Technical Sessions And Two Parties Mark Spring Meeting

By Phil B. Redeker

DETROIT—With most of the 200 that attended echoing the phrase "the best convention of all time," the annual spring meeting of the American Society of Refrigerating Engineers closed here last Friday after three days of a technical discussion, round after round of entertainment provided by the Detroit section, and the renewing of friendships in the more intimate surroundings furnished by hotel rooms.

Proof that the technical program was of unusual interest was demonstrated by the attendance at the morning technical sessions and the fact that the attendance the final day was greater than at any of the other sessions, a matter which veteran members couldn't remember as ever happening before.

Progress in standards, air conditioning, and commercial machinery developments were the topics attacked in the technical sessions.

Report of the committee on standards of measurement, which proposes a new method of rating industrial refrigerating machinery which would supersede the old "standard ton" method of rating, was read by A. B. Stickney of Armour & Co. The report evoked considerable discussion and may come up for final consideration at the annual meeting in December.

Pioneer work in testing the capacity of expansion valves was described by D. E. Wile of Detroit Lubricator, and methods of rating and selecting extended cooling surfaces was discussed by H. B. Powhall of York Ice Machinery Corp. at the "progress in standards" session on the final day.

Liveliest of all the sessions was that of the opening day on air conditioning. F. O. Urban described General Electric's new psychrometric chart, and

## Chicago Utility Sponsors Air-Conditioning Show

CHICAGO—Thousands of Chicagoans took advantage of an opportunity to see at one place and at one time the progress which has been made in summer air conditioning when they attended the Commonwealth Edison Co.'s Fourth Annual Air Conditioning Show held the first two weeks of this month at the main electric shop of the Commonwealth Edison Co. in the heart of the "Loop" shopping district here.

Twelve manufacturers and distributors of air-conditioning equipment exhibited their 1935 models, with most of the devices shown in actual operation.

Air-conditioning equipment most adaptable to the average home, office, and small shop was featured in the show.

Exhibitors at the Fourth Annual Air Conditioning Show included: Kelvinator Corp., General Refrigeration Sales Corp., Frigidaire Corp., York Ice Machinery Corp., Chrysler Corp., Midwest Engineering & Equipment Co., Aigard Co., Crane Co., Kroeschell Engineering Co. (representing Westinghouse), Fairbanks-Morse Co., Strang Chicago Air Conditioning Co., and Ilg Electric Ventilating Co.

## Milwaukee Bulletin Minimizes Hazards Of Refrigerants

MILWAUKEE—Better Business Bureau, Milwaukee Association of Commerce, has issued a bulletin, dated May 17, dealing with the subject of refrigerants. The bulletin minimizes the danger to life and health that can be expected from the toxic qualities of the various refrigerants.

Text of this Milwaukee Better Business Bureau bulletin is as follows:

"Technical, scientific, and health authorities for years have recognized artificial refrigeration as a great contribution to health and comfort. From time to time, however, artificial refrigeration has been disparaged and attacked from various sources, but these attacks have been exposed finally as false exaggerated, unfair and/or misleading.

"Refrigerating history has its record of explosions, fires, and injuries due to artificial refrigerants, but these have become extremely rare as construction and knowledge have improved.

"A careful and impartial survey discloses that scientific and mechanical authorities find little if any hazard in artificial refrigerants except as they may occur in industrial accidents, occasional trouble with large commercial or multiple installations and injury to service men who fail to make use of the recognized precautions and safeguards.

(Concluded on Page 22, Column 5)

## 41,000 Specification Sets Not Enough; to Be Run Again in June 12 Issue

Orders for more than 41,000 copies of the specifications of 1935 household electric refrigerators published in the March 20 issue of ELECTRIC REFRIGERATION NEWS have been filled without satisfying the demand.

As the supply of this issue has been exhausted, the News will again publish specifications of 1935 models in the June 12 issue.

The information will be revised and corrected, and data will be given on the new models which have been introduced since March.

When ordering extra copies of the News, please enclose remittance (10 cents per copy). Obviously, the expense of bookkeeping and billing cannot be incurred in handling thousands of orders involving amounts of only a few cents each.

## Nema Forms Refrigeration Accessories Division; Air-Conditioner Manufacturers Reorganize; RMI Leaders Attack New Deal Policies

### Equipment Standardization & Employee Relations Considered by RMA

HOT SPRINGS, Va.—Discussions of fair trade practices, standardization of equipment, and employee relations enlivened the two-day meeting here last Friday and Saturday of the Refrigerating Machinery Association.

Speakers at the RMA sessions also attacked the general policies of the New Deal, and their effect on business activities in the industry.

Rainy weather Friday put somewhat of a crimp on the sweepstakes and blind bogey golf tournaments, but several members of the association managed to finish the 18-hole Homestead course, be entertained by J. M. Fernald at the "Nineteenth Hole," and crown F. M. Roessing of the Roessing Mfg. Co., sweepstakes winner.

D. Norris Benedict, Frick Co., president of the association, opened Friday's meeting with a short address, stressing the advantages of the close cooperation made possible through the association, and urging an even closer association in working out common problems ahead.

In presenting his first report as executive vice president and secretary of the RMA, William B. Henderson took occasion to offer members a number of constructive criticisms, which, he said, were from the viewpoint of a newcomer in the field. His suggestions were warmly welcomed by members of the organization.

While compiling a draft of the association's history, Mr. Henderson said, he was impressed by the fact that, "although this association has been in existence, under various names, for over 40 years, the questions we are dealing with today are fundamentally the same as those of 40 years ago.

"Throughout the history of the association there has been a noticeable lack, justified or unjustified, of full cooperation between the employers of this industry," he said. "Full cooperation was short-lived—was cut down by an ever-present undercurrent of distrust and suspicion of one competitor toward another.

"True, substantial, though slow, progress has been made over the years, but we are far short of our goal."

The secretary pointed the accomplishments of the Iron & Steel Institute

### Constitution Adopted & Officers Elected at First Meeting

HOT SPRINGS, Va.—A lusty infant—air conditioning—took an important step forward here last Thursday, when the Air Conditioning Manufacturers Association held its first annual convention, completed plans for reorganization begun early last month, adopted a formal constitution, and elected officers and directors to guide its policies in the coming year.

Heading ACMA during the year ahead will be P. A. McKittrick, Parks-Cramer Co., as president; J. F. G. Miller, B. F. Sturtevant Co., as vice president; and W. B. Henderson as executive vice president.

On the board of directors are Thornton Lewis, Carrier Engineering Corp., Stuart E. Lauer, York Ice Machinery Corp., J. A. Harlan, Kelvinator Corp., H. C. Grubbs, De La Vergne Engine Co., W. F. Armstrong, Frigidaire Corp., J. J. Donovan, General Electric Co., S. F. Myers, Westinghouse Electric & Mfg. Co., and C. T. Morse, American Blower Co.

Originally the Unit Air Conditioner Manufacturers' Association, the name of the organization was changed and reorganization plans inaugurated when the group came under the wing of the Refrigerating Machinery Association, whose headquarters staff has

(Concluded on Page 2, Column 1)

## Dolison to Direct Coltrol Sales

CHICAGO—D. H. Dolison has been appointed general manager of the Commercial Coil & Refrigeration Co. here, reports Clifford L. Ellison of that organization. Mr. Dolison was formerly with the Brunswick-Balke-Collender Co., and previous to that time was general sales manager for the Temp-rise Products Corp.

Commercial Coil & Refrigeration Co. has developed a new beer cooler, says Mr. Ellison, which will be sold under the trade name of "Coltrol." The manufacture of finned coils will be discontinued except on special order. The company will continue to manufacture drainer plates for coil and novelty boxes for manufacturers.

### Advertising Policies and Practices Discussed by Household Section

By T. T. Quinn

HOT SPRINGS, Va.—Organization of a Refrigeration Accessories section, to include manufacturers of cabinets and other accessories which do not come under the scope of any other NRA code, was approved by the board of governors of Nema during the annual convention of the organization last week.

These accessories manufacturers will now operate under the same general code which governs the household and commercial refrigeration sections of Nema.

With that exception, little other than a routine discussion of business matters occupied the attention of members of the division during their meetings last Tuesday and Wednesday.

At the household refrigeration meeting, presided over by Thomas Evans, president of Merchant & Evans, chairman of the section, considerable time was devoted to a discussion of policies and practices regarding advertising. The discussion followed a report by Vance Woodcox, chairman of the advertising and sales promotion committee.

Next meeting of the division was set for July 9, at Atlantic City.

Present at the Household section meeting were:

Powel Crosley, and Lewis Crosley, Crosley Radio Corp.; E. G. Biechler, W. F. Armstrong, H. W. Newell, and Frank Pierce, Frigidaire Corp.; P. B. Zimmerman, General Electric Co.; C. J. Gibson, Gibson Refrigerator Corp.; H. W. Burritt and Vance Woodcox, Kelvinator Corp. and Leonard Refrigerator Corp.; Thomas Evans, Merchant & Evans Co.; Howard E. Blood and John H. Knapp, Norge Corp.; J. H. Schroeder, Sunbeam Electric & Mfg. Co.; Frank S. McNeal, Universal Cooler Corp.; A. E. Allen, R. M. Imhoff, and P. Y. Danley, Westinghouse Electric & Mfg. Co.

The meeting of the commercial refrigeration section Wednesday morning was devoted largely to a discussion of methods for arriving at a more

(Concluded on Page 2, Column 4)

## 5,514 Refrigerators Sold In Kansas City

KANSAS CITY—Household electric refrigerators sold in this city during the first quarter of 1935 totaled 5,514 units as compared with a total of 3,779 for the same three months of last year, an increase of 46 per cent, reports G. W. Weston, secretary-manager of the Electric & Radio Association.

Comparative month-by-month figures for the first three months are: January, 1934, 690—January, 1935, 1,293; February, 1934, 1,146—February, 1935, 1,415; March, 1934, 1,943—March, 1935, 2,806.

Mr. Weston points out that "dealers have been cooperating nicely on ice box allowances. Terms are not exceeding 24 months, the 6 per cent carrying charges are being followed uniformly by the trade, and prices are stable.

"All of this," he continues, "is in sharp contrast to the recent blow-up and demoralization in the market for used automobiles."

## Good Fellowship in the News' Offices



Two general views of the crowd at the "Refrigeration Fiesta," Electric Refrigeration News' welcome to the A.S.R.E. conventioners and their guests, in the new air-conditioned addition to the News' present offices.



(1) Corine Muer, entertainer extraordinary to the refrigeration industry, beams on a guest. (2) David L. Fiske, A.S.R.E. secretary, discusses Society affairs with Glenn Muffy. (3) Mrs. Dan Wile, John Wyllie (Temprite), Dan Wile (Detroit Lubricator), and Mrs. M. C. Terry (Kelvinator), at dinner. (4) Thomas Coyle of R. & H. Chemical Co. waiting for the show to start.



## Air Conditioner Manufacturers Complete Reorganization of Association

(Concluded from Page 1, Column 4)  
been handling ACMA's business affairs since April 3.

RMA and ACMA are two distinct organizations, however, despite the fact that their businesses are parallel. Both RMA and Nema members are to be found on ACMA's present membership roster.

### 10 Manufacturers in Group

Ten of the leading manufacturers of air-conditioning equipment make up the new organization. They are:

Carrier Engineering Corp., De La Vergne Engine Co., General Electric Co., Kelvinator Corp., John J. Nesbitt, Inc., J. H. McCormick & Co., Parks-Cramer Co., B. F. Sturtevant Co., Westinghouse Electric & Mfg. Co., and York Ice Machinery Corp.

When the Unit Air Conditioner Manufacturers Association was founded in January, 1934, it was engaged primarily in the investigation and setting up of proper engineering standards in the industry.

With increasing activity in the field of air conditioning, however, it was the opinion that a functioning organization, operating as an independent unit, would best serve the industry's interests by going beyond engineering problems and establishing broad and sound trade practices in an effort to avoid the abuse of public confidence which has been the bane of other rapidly-growing industries in the past.

### Objects of Association

Objects of ACMA, as set forth in the constitution are:

1. To promote, in every lawful manner, the common interests of members in manufacturing, engineering, marketing, safety, transportation, and other industrial problems.

2. To develop and establish engineering standards covering, among others, the design and rating of equipment, and application.

3. To collect and disseminate information of value to its members and to the public regarding products of the industry.

4. To encourage advancement and improvement in all branches of the industry by the promotion and support of investigations, experiments, standardization, research, and the collection and distribution of statistics and information of value to members.

5. To undertake, promote, and carry on other activities in the advancement of the common interests and well-being of members.

6. To develop a code of fair trade practices.

### Limited to Manufacturers

Membership in ACMA will be limited to corporations, firms, and individuals promoting or actively engaged in the manufacture for sale of air-conditioning units or substitutes for them.

"Unit system" is defined as "an air-conditioning system embodying a unit shipped substantially complete or built and shipped in sections so that the only field work necessary is the assembling together of the sections without restoring to any field fabrication."

It must perform the following functions as a minimum: the cooling, dehumidification, and circulation of the air, for summer cooling; and, for year around work, must add heating and humidifications to these functions.

"Substitute system" means, in ACMA terms, "an air-conditioning system which performs the same functions as a unit system, but in

which the equipment is partly or wholly fabricated in the field."

Membership is attainable by a majority vote of the board of directors, and good standing in the organization is contingent upon the member's remaining actively engaged in the air-conditioning industry, compliance with provisions of the constitution and by-laws, and payment of dues and assessments.

### Program of Education

Initial efforts of ACMA will be directed toward (1) an intensive program of education, to bring home to the general public the benefits of air conditioning; (2) insistence that installations of air-conditioning equipment be made only by reputable firms, to assure customer satisfaction; (3) the working out of common problems by a program of cooperation.

Studies of progress in air-conditioning engineering standardization, work on which has been under way for several months, received close attention from the representatives of manufacturers attending Thursday's meeting. The committee is composed of leading engineers representing each member.

### Other Committees

In addition to the executive committee, other groups were appointed to duties in ACMA, as follows:

Fair Trade Practice—Stuart E. Lauer, York Ice Machinery Corp., chairman; W. F. Armstrong, Frigidaire Corp.; J. A. Harlan, Kelvinator Corp.; J. J. Donovan, General Electric Co.; Thornton Lewis, Carrier Corp.; J. F. G. Miller, B. F. Sturtevant Co.

Finance—H. C. Grubbs, De La Vergne Engine Co., chairman; Mr. Armstrong, and Mr. Lauer.

Membership—Mr. Miller, chairman, Mr. Lauer, Mr. Donovan, and Mr. Grubbs.

### Delegates at Three Meetings

The complete list of those present during the three days' sessions of RMA, RMA, and ACMA, follows:

H. C. Ahren, C. Schmidt Co., Cincinnati; C. E. Allison, Canadian Ice Machine Co., Toronto; W. F. Armstrong, Frigidaire Corp., Dayton; W. H. Aubrey, Frick Co., Inc., Waynesboro, Pa.; A. H. Baer, Carbondale Machine Corp., Harrison, N. J.; I. C. Baker, York Ice Machinery Corp., York, Pa.; D. Norris Benedict, Frick Co., Inc., Waynesboro, Pa.; H. E. Bollinger, Phoenix Ice Machine Co., Cleveland; J. H. Brown, Henry Vogt Machine Co., Louisville, Ky.; G. L. Brunner, Brunner Mfg. Co., Utica, N. Y.

W. H. Carrier, Carrier Engineering Corp., Newark; J. T. Cheney, NEMA, Washington, D. C.; J. J. Donovan, General Electric Co., New York City; F. R. Erbach, General Refrigeration Corp., Beloit, Wis.; J. M. Fernald, Baker Ice Machine Co., Inc., Omaha; H. P. Gant, Carrier Engineering Corp., Philadelphia; H. C. Grubbs, De La Vergne Engine Co., Philadelphia; J. A. Harlan, Kelvinator Corp., Detroit; O. P. Heller, Creamery Package Mfg. Co., Chicago; G. A. Heuser, Henry Vogt Machine Co., Louisville, Ky.

A. W. Johnson, Vilter Mfg. Co., Milwaukee; E. A. Kleinschmidt and S. E. Lauer, York Ice Machinery Corp., York, Pa.; Thornton Lewis, C. R. Lyle, E. T. Lyle, all of Carrier Engineering Corp., Newark; P. A. McKittrick, Parks-Cramer Co., Fitchburg, Mass.; S. B. McNaught, general counsel, York, Pa.; F. S. McNeal, Universal Cooler Corp., Detroit; J. F. G. Miller, B. F. Sturtevant Co., Boston.

H. C. Morrison, Curtis Mfg. Co., St. Louis; D. J. Murphy, NEMA, Washington, D. C.; F. M. Roessing, Roessing Mfg. Co., Pittsburgh; S. N. Nicholson, Westinghouse Electric & Mfg. Co., New York City; Lee Nusbaum, Pennsylvania Engineering Co., Philadelphia; J. W. O'Leary, Machinery & Allied Products Institute, Chicago; T. S. Pendegast, Universal Cooler Corp., Detroit; J. O. Ross, S. H. Shipley, W. S. Shipley, all of York Ice Machinery Corp., York, Pa.

G. A. Stevenson, Knickerbocker Stamping Co., Parkersburg, W. Va.; D. B. Snively, Frick Co., Inc., Waynesboro, Pa.; Emil Vilter, Vilter Mfg. Co., Milwaukee; G. E. Wallis, Creamery Package Mfg. Co., Chicago; Haldeman Finnie, manager, Refrigeration Division of Nema, Detroit; H. Bissell Carey, Automatic Refrigerating Co., Hartford, Conn.; Thomas Evans, Merchant & Evans Co., Philadelphia; H. W. Newell, Frigidaire Corp., Dayton; W. B. Henderson, executive vice president, RMA; John Kirby, assistant secretary, RMA.

H. A. Feldbush, Carbondale Machine Corp., Harrison, N. J.; A. V. Hutchinson, American Society of Heating & Ventilating Engineers, New York City; J. I. Lyle, Carrier Engineering Corp., Newark; H. C. Ramsey, Worthington Pump & Mach. Corp., Harrison, N. J.; Henry Torrance, Carbondale New York Co., New York City; J. K. Knighton, Kelvinator Corp., Detroit; W. D. Jordan, Savage Arms, Inc., New York City; S. F. Myers, Westinghouse Electric & Mfg. Co., Pittsburgh; C. A. Pearson, York Ice Machinery Corp., York, Pa.; P. W. Cashman, C. W. Power, W. H. Reid, all of Canadian Ice Machine Co., Toronto, Can.; W. W. Rhodes, Kinetic Chemicals, Inc., Wilmington, Del.; R. T. Smith, Starr Co., Richmond, Ind.; Paul Sullivan executive secretary, Commercial Refrigerator Mfrs. Association, Chicago; W. C. Whitcher, "Dry-Kold" Refrigerator Co., Niles, Mich.; E. F. Buelow, Reliance Refrigerating Machine Co., Chicago.

### San Francisco Firm Rents Refrigerators for Summer

SAN FRANCISCO—Buford Washing Machine Co. of Fresno, Calif., electrical appliance dealer, has introduced an offer whereby refrigerators are rented for the summer. The company hopes to convert rentals into sales.

## Advertising Policies Studied by Nema

(Concluded from Page 1, Column 5)

uniform method of testing and rating commercial refrigeration machinery.

A. J. Harlan, chairman of the commercial section, presided at the meeting. Several members of the Refrigerating Machinery Association, in Hot Springs for their meeting, were present as Nema guests.

Those attending the section meeting included:

C. R. Lyle and Thornton Lewis, Carrier Engineering Corp.; W. F. Armstrong, H. W. Newell, and Frank Pierce, Frigidaire Corp.; J. J. Donovan, General Electric Co.; H. W. Burritt, Kelvinator Corp.; Thomas Evans, Merchant & Evans; J. H. Knapp, Norge Corp.; Louis Ruthenburg, Servel, Inc.; F. S. McNeal and T. S. Pendegast, Universal Cooler Corp.; R. M. Imhoff and P. Y. Danley, Westinghouse Electric & Mfg. Co.; Stuart E. Lauer, S. H. Shipley, and C. A. Pearson, York Ice Machinery Corp.

Guests were W. H. Aubrey, Frick Co., Inc.; G. L. Brunner, Brunner Mfg. Co.; W. D. Jordan, Savage Arms, Inc.; A. H. Baer, Carbondale Machine Corp.; W. B. Henderson, secretary of RMA. The division will meet next at Atlantic City on July 8.

## Government Men Speak At Policies Meeting

Tuesday night's Nema Policies Division meeting, only one of the division's three meetings to which the public was admitted, was devoted to speeches by two representatives of the present administration, Dr. Leon C. Marshall, executive secretary of the National Industrial Recovery Board, and Paul Fitzpatrick, public relations director for the Federal Housing Administration.

Dr. Marshall's address, on "NRA Policies and Procedure," was, for the most part, an exposition of the ends and aims of the NRA—past, present, and future.

Frankly admitting that in several instances NRA procedure regarding codes was not all that might be desired, Dr. Marshall urged Nema members to cooperate with the government in its program, and to be prepared to offer suggestions in the event the NRA is continued past June 16.

Hurriedly gotten together as the codes were, the speaker explained, some mistakes in judgment could not be avoided. Should the NRA be continued (and Dr. Marshall gave as his opinion that it would be) a general revision of codes will be made, and most difficulties ironed out.

"Simplicity, with flexibility," will be the NRA watchword in future code work, Mr. Marshall said. With two years of experience behind them—NRA officials in formulating codes and industry in the cooperation made possible under them—and with a mutual understanding of each other's problems, Mr. Marshall thought the future of NRA—business relations could not help being much happier than the past.

Speaking on "\$50,000 Modernization

Loans," Mr. Fitzpatrick deplored the apathy which banks and industry in general are evidencing toward the increased business made possible under FHA loans.

Banks, Mr. Fitzpatrick thought, are apathetic toward the FHA program because it is, for them, a new system of loans—although, he explained, it is really the only logical one.

"FHA makes possible an honest method of borrowing," he said. "The loans are repaid in installments—which, after all, is the way in which the borrower makes his money."

"In the past, when a man went to a bank to borrow \$1,000, he signed a note that said, 'One year (or whatever the term was) after date, I promise to pay to this bank \$1,000, with interest at 6 per cent.' Now, both the banker and the borrower knew, when the note was signed, that that money would not be paid back at the end of the term. They both knew that, when the year was up, the borrower would come in, pay his interest, and renew the note—and that, unless something unusual happened, this practice would be continued year after year."

"It's seldom that a person gets his hands on \$1,000 in a lump sum, so that he can walk into the bank and say, 'Here's your money.' He earns it in installments."

"If he's able to pay the bank a certain sum every month—as the FHA loan makes possible—he'll be able to pay off that loan, just as he'd pay for an automobile, an electric refrigerator, or a radio."

What is needed, Mr. Fitzpatrick said, is for business men in the various communities to insist that their bankers make such loans possible.

"Here's the only Federal program that offers you something for nothing," he said, "and you aren't taking advantage of it."

The reason electrical equipment manufacturers and their representatives must supply the motivating force, Mr. Fitzpatrick said, is that they understand the selling problem better than does the contractor.

The amazing progress in electric refrigeration during the past few years, he said, is evidence of what can be done by the electrical industry when the principles of salesmanship are applied.

Under the new \$50,000 modernization loan program, the electrical industry can, with proper promotional work, benefit more than any other industry, Mr. Fitzpatrick pointed out. This program makes possible loans for much more extensive improvements than could be made under the previous setup.

The average loan, he estimated, would be somewhere in the neighborhood of \$5,000—and improvements can be made on property in which the occupant is the lessee as well on that which he owns.

Technically, he pointed out, the improvements must be made on real property only if FHA funds are used. But, he added, there are methods of installing electrical appliances by which the problem can be met and overcome.

He assured his listeners that technicalities would not stand in the way of modernization and improvement on loans obtained through FHA.

"Why," he demanded, "don't youse guys do something about it?"

## To Display Case, Bottle Cooler and Cabinet Manufacturers

Consider our many services when you are ordering your FABRICATED and PORCELAIN ENAMELED cabinet parts.

- We FABRICATE and ENAMEL complete cabinets to your specifications.
- We FABRICATE and ENAMEL cabinet parts to your specifications.
- We do PORCELAIN ENAMELING on your fabricated parts.
- We furnish PORCELAIN ENAMELED Side Panels, and Food Compartments complete.

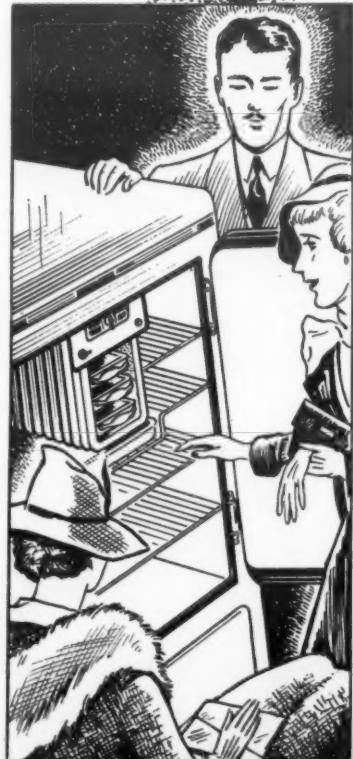
Our modern plant is equipped for mass production of porcelain enameled and fabricated refrigerator cabinets and cabinet parts. We can meet your production requirements.

Send us your blueprints for estimates and quotations.

Davidson Enamel Company  
Clyde, Ohio

Your  
SELLING JOB  
IS DONE

... When  
they EXAMINE  
COPELAND



THE outstanding quality built into Copeland is so apparent, that Copeland dealers everywhere have found it has instant appeal. It is no trouble at all to close a Copeland sale. Copeland is not a "flashy" job, built down to a price. Copeland's grace and simple beauty attracts instantly. A closer examination reveals quality in every manufacturing detail. And the smooth-running, quiet Copeland unit gives a prospect such a demonstration of performance, that closing the sale is mere routine. See Copeland for yourself.

COPELAND REFRIGERATION CORP.

Manufacturers of a Complete Line of Household and Commercial Refrigeration

Holden Ave. at Lincoln ... DETROIT, MICH.

**Copeland**  
DEPENDABLE Electric REFRIGERATION



## Cameron Says 2,000 Men in Major Stores Took G-E's Training

CLEVELAND—More than 2,000 employees of electrical appliance departments of department stores have taken the basic training course on General Electric home appliance salesmanship, reports Ralph C. Cameron, manager of the department store division of General Electric's specialty appliance department.

Seven hundred of these employees also have taken the advanced course, he says.

"General Electric has spent more than \$125,000 in providing this course of training for salesmen," Cameron says, "and we are gratified at the huge number of salesmen who have signed up for the course. Several thousand already have graduated."

"These include, of course, salesmen employed by dealers, distributors, utility outlets, as well as department stores. However, the manner in which department store salesmen have taken to the course indicates that they are alive to the value of sales training."

The basic training course consists of 16 films and records, and is intended primarily for salesmen just entering an organization. Training leader manuals with examinations are provided as guides in holding meetings for group discussions.

Subjects covered by films and records in this course touch upon General Electric's "House of Magic," the G-E merchandising program, refrigerator mechanism and cabinet, the G-E range and G-E Calrod heating element, dishwashers, dominant buying motives, buying decisions, selling process, calls at the home of prospects, sales presentation and closing.

Supplementing the basic course is the G-E Kitchen Appliance sales correspondence course, consisting of eight books built around the all-electric kitchen theme. Individual instruction service is given by LaSalle Extension University.

In addition there is the G-E complete advanced course, a correspondence course of eight assignments built around "the art of living electrically." This course applies the basic selling principles to the kitchen products and to the washer, ironer, and cleaner, as well. Individual instruction service also is given on this by LaSalle Extension University.

A short advanced course is offered those who previously have finished the kitchen appliance course.

To keep salesmen advised of new ideas, G-E also issues salesmen's bulletins bi-monthly in four sections to serve as a continual follow-through and application of the principles covered in the kitchen appliance and home appliance salesmanship courses.

"We have found that, as a general rule, our best salesmen, regardless of the outlet with which they are connected, are those who have taken the G-E LaSalle training courses," Mr. Cameron says. "By the end of this year we hope to have a total of 3,000 department store employees enrolled in the courses."

## Grunow Seeks Biggest Weekly Sales Mark

CHICAGO—In a drive to register the biggest week's sales volume in Grunow's history, General Household Utilities this week opened its "Record Breaker Contest," which will last from May 26 to June 1 inclusive. The factory has zoned all territories, and has placed quotas on all cities and towns.

Record Breaker Contest prizes are as follows:

A complete set of Walter Hagen "Honey-Boy Woods" golf clubs, and a complete nine-club set of Walter Hagen International "Honey-Boy" irons will be awarded to the distributor in each of the three districts, as grouped in the weekly sales standing reports, who goes over his quota in shipments to dealers by the greatest percentage.

The factory will award a complete four-club set of Walter Hagen "Honey-Boy Woods" to the distributor in each of the three districts, first reporting by wire and substantiating by written report, that he has shipped his contest quota.

A complete four-club set of "Sir Walter Woods" will be given to the distributor salesman in each of the three districts, whose distributor is first to report by wire that the salesman has earned 20 points and refrigerators have been shipped.

The factory will also award a Model 571 Grunow radio to every distributor salesman earning 20 points. One point is awarded for each refrigerator, order for which he secures personally and ships by June 3. Five points are awarded for every new dealer he franchises with qualifying order for three refrigerators which are shipped by June 3.

An individual silver cup from the "Mother Ship Cup" will be awarded by the factory to every distributor selling his quota during the record breaker drive.

Arnold Wholesale Corp., Cleveland distributor for Grunow refrigerators and radios, has offered additional prizes of 10 Grunow Model No. 1162 radios listing at \$127.50 each, to the ten dealers who make the best percentage of their quota during the "Record Breaker Week." Stipulation of the wholesale company is that refrigerators must be purchased during the week of May 26 for delivery to the dealer not later than June 3.

## 3,500 Attend 3-Day Cooking School

COLUMBUS, Ohio—Approximately 3,500 women attended the three-day cooking school sponsored by the Westgate Electric Shop, Westinghouse dealer here. Miss Edna I. Sparkman, director refrigeration home economics, conducted the school.

As each woman entered the theater she was given recipe folders, Westinghouse literature, and an invitation to go to the Westgate Electric Store to see an ironer demonstration given by Miss Schmidt. Door prizes—ranging from food baskets to a set of dishes—were drawn at the close of each afternoon.

## Sales Idea for the Week

By V. E. Vining, Manager of Department Store Sales, Westinghouse Electric & Mfg. Co.

I am fed up on salesmen who never look at the things they are selling—and there are literally thousands of them.

Listen—

Go park your hips on a chair and take a good long look at that gadget from which you make a living.

And I'll give you a tip—if, after about 15 minutes of concentration, you haven't found a new sales argument, a new approach, something you have missed in your presentation, something new to talk about—you need a mental massage.

Your sales manager can give you information, inspiration, guidance—he can drive you to work, kid you, shame you, give you prospects, and help close your deals; but, he can't give you initiative, brains, or good common horse sense.

He can put ideas in your head, and words into your mouth; he can draw pictures for you, or explain a puzzling point—but the sales manager never lived who can make you produce unless you, yourself, do something besides put one foot in front of the other and call it a day's work.

Now, sit down in front of that gadget and develop a wrinkle between the eyes.

It'll pay.

## Steuffer Opens New Store In Minneapolis

MINNEAPOLIS—O. E. Steuffer, Inc., General Electric distributor here, has opened a new store at Tenth and Nicollet Aves. in order to increase salesroom space.

Office headquarters will remain

in the Baker building on Marquett Ave.

The new store has a model kitchen equipped with an electric range, dishwasher, refrigerator, and other appliances, and a model laundry with tubs, electric washer, and ironer.

Appliances are hooked up for actual demonstrations so that visitors may see the work performed by each household appliance.

## 1,233 Units Sold in 3 Days by Utility

NEW YORK CITY—During the first three days of the Associated Jubilee Load Builders Campaign now being conducted by the Utilities Management Corp. 1,146 electric and 87 gas units were sold by company and dealers of the system.

Manufacturers have offered prizes to utility and dealer salesmen selling the largest volume of their respective makes of refrigerators during the period of the contest—May 13 to June 19. Prizes are listed as follows:

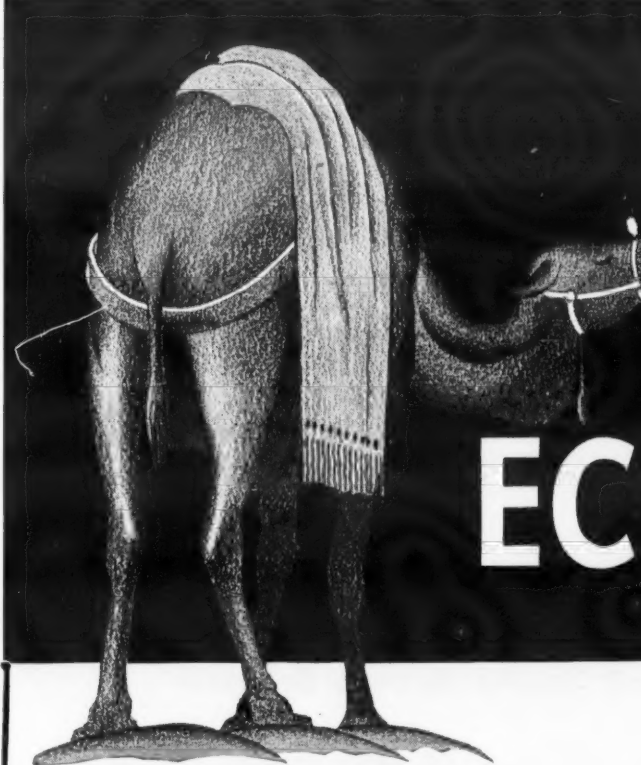
Frigidaire (President Biechler award) \$100 cash prize to top utility or dealer salesman selling largest volume of Frigidaires; General Electric award, X7 Monitor Top refrigerator to top utility or dealer salesman; Kelvinator (Vice President Burritt award) Kelvinator model SD-782 refrigerator to utility or dealer salesman selling largest volume of Kelvinators; Westinghouse (Vice President Allen award) two DLX-78 Westinghouse refrigerators.

In the case of Westinghouse one prize will be similarly awarded to the leading utility salesman and one to the leading dealer salesman.

Sales reported must be installed in the territory served by the associated system. Company and dealer salesmen's reports must be in the hands of the group manager by noon, Monday, July 1, and all sales must be installed on or before July 15.

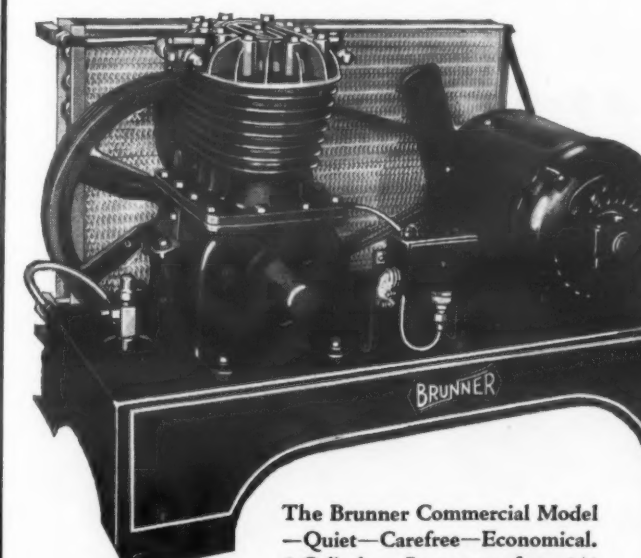
## Stratton & Terstegge Handle Only Electrolux

LOUISVILLE, Ky.—The Stratton & Terstegge Co. here is now handling Electrolux gas and kerosene refrigerators exclusively.



ECONOMY

# Rivalling the Camel's



The Brunner Commercial Model—Quiet—Carefree—Economical. 2 Cylinders. In a range from 1/4 H. P. to 2 H. P.

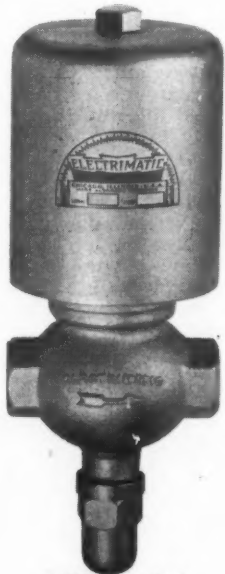
● Brunner refrigeration units have the happy faculty of asking little and giving much. Skill in designing and constructing Brunner Compressors and Highsides have produced an eminent degree of operating economy... to the extent that probably no competing units today can offer so much effective refrigeration at so consistently as low a rate as Brunner. This is no idle hope! It is a practicality. Abundant evidence is offered by the scores of Brunner installations now being completed on the basis of comparative tests... now, more than ever, Brunner is "The Fastest Growing Name in the Industry". There's a Brunner unit to solve present problems: eight models of compressors, 41 models of highsides from 1/6 H. P. to 15 H. P. New catalog packed with useful facts. Free! Write: Brunner Manufacturing Co., Utica, N. Y., U. S. A.

# Brunner

A NAME BUILT BY 29 YEARS OF SERVICE

## ELECTRISTOP VALVE

FOR ALL REFRIGERANTS INCLUDING AMMONIA



TYPE-SLP

THE TYPE-SLP-ELECTRISTOP VALVE IS A TIGHT CLOSING PACKLESS VALVE FOR USE ON ALL LIQUID LINES TO START OR STOP FULL LINE FLOW.

THIS VALVE PROVIDES A FULL AND UNRESTRICTED FLOW FOR THE PIPE SIZE USED.

SIMPLE AND FOOLPROOF CONSTRUCTION. ALL WORKING PARTS ENCLOSED.

EXCESSIVE PRESSURES OR LINE SURGES WILL NOT AFFECT VALVE.

EMERGENCY HAND OPERATED OPENING STEM IS STANDARD EQUIPMENT.

THIS VALVE IS FURNISHED IN ALL SIZES FROM 3/8" TO 3" PIPE SIZE. VALVES FROM 1" UP ARE EQUIPPED WITH STD. FLANGES. COMPANION FLANGES, BOLTS, NUTS AND GASKETS ARE INCLUDED AS STANDARD EQUIPMENT.

## THE ELECTRIMATIC CORPORATION

2100 INDIANA AVENUE  
CHICAGO, U. S. A.



## Refrigerating Machinery Industry Leaders Launch Open Attack On New Deal at Meeting

By T. T. Quinn

HOT SPRINGS, Va.—The New Deal and all its works was condemned by Stewart Bruce McNaught, general counsel for the Refrigerating Machinery Industry, in a speech before RMI members at their annual meeting at the Homestead here Thursday.

Titled "Comments on Pending National Legislation," Mr. McNaught's address opened with criticism on past NRA performance and some speculation as to its future, and closed with a scathing denunciation of the Wagner bill, which he classed as one of the most grossly unfair pieces of legislation ever to come before Congress.

Several members of Nema, who had remained at the resort following the close of their meetings Wednesday, attended the session as guests of RMI. Later the two groups, as well as members of the Commercial Refrigeration Manufacturers Association (CRMA) attended a group luncheon at which Prentiss Cooney, code administration director of NRA, was a speaker.

### Result Through Revolution

"The New Deal, whether it attempts reforms in business, industry, public utilities, labor relations, banking, or social security, is merely endeavoring to reach a perhaps desirable result through revolution, instead of proceeding, as has been the custom in the past, by evolutionary processes," Mr. McNaught said.

"There has not been a political party in America during the twentieth century that would have dared to omit from its platform promises to better the social and economic position of the average man. Campaign speeches of the two candidates in the last election both carried the theme song of economic justice—a theme song, unfortunately, that can be played in vastly differing keys; a theme song

sometimes melodious, oftentimes discordant.

"But, whether we like it or not—and I am frank to say I do not—the opera will go on. Make no mistake about that fundamental. Never again will we see the 'good old days.'

### Outlines NRA's History

"This statement may seem like a bitter pill to some of us, but unless we are able to grasp that inevitable background, realize it and recognize it as a *fait accompli* we will be lost in the stream of present events, and shall lose our effectiveness in our endeavors to prevent that stream from overflowing its banks."

The speaker then outlined the history of NRA, preferring that rather than to discuss its future, which, he quoted Donald R. Richberg as saying, was "in the lap of the Gods."

NRA, Mr. McNaught said, had been enacted as the key legislative measure in the New Deal by a Congress "swept into power through the magic of a man who was looked upon as the savior of his country," and at a time when, economically, the nation was at its lowest ebb.

### Acclaimed by Many

Hailed as a cure-all for society's every ailment, Mr. McNaught said, it was acclaimed by labor, industry, and the public, and "those calmer souls who doubted either remained silent, or, if they became articulate, were branded as 'Tories,' 'reactionaries,' or 'plain outright traitors.'"

"Curiously enough, he said, 'the term 'rugged individualist' lost its earlier meaning as applied to the founders and pioneers of our country, and became an epithet of derision synonymous with obstructionist.'"

In carrying out the experiment, the men representing business, labor, and the administration were all beguiled

by the same fallacies, Mr. McNaught said.

"Business was impressed with the idea that, with the anti-trust laws suspended, all its troubles were over, and that it would be but a short step to undreamed of profits. Under many different schemes, the codes which were written were based, in most instances, on the principle that it is better to sell fewer goods at a high price than more goods at a lower price.

### Organized Labor Impressed

"Organized labor was impressed with belief that the law now gave them a club with which not only to organize all labor, not only to eradicate all evils in the employment system, but also to raise the price of labor to exorbitant heights. This same basic fallacy took the form of attempting to increase purchasing power by raising the hourly price of labor—preferring a small volume of employment at a high hourly rate to more employment, and therefore more income, at a lower hourly rate.

"The consumer, if he thought at all, thought that his real income would be increased, together with the amount of his leisure time, and, through the adoption of standards by industry, the hazards of purchasing would be materially reduced."

### Made Business Difficult

NRA, Mr. McNaught said, consented to and even encouraged these fallacies, approving wage policies that raised hourly rates and therefore restricted employment. "They imagined they were fighting cut-throat competition and the sweating of labor, when, in fact, they were making it as difficult as possible for business to sell its products and to re-employ labor to produce its products.

"All were doomed to disappointment. Higher prices met with consumer resistance and a resulting decreased volume of sales. Unions found the same economic formula at work—the higher the labor costs, the less work, and consequently smaller total wages.

"The consumer, as usual, was completely forgotten. His was a voice crying in the wilderness. The benevolence of NRA toward monopoly provisions, such as are found in the Ice Industry code, brought the prices

of necessities higher—higher than the increase in his real income.

"The industrial plant that could not find a market at the high prices became a dead weight, obstructing the revival of investment. The labor which could not be employed because unit prices of goods and hourly wages were too high lived on its savings or went to relief rolls."

Bedlam reigned with NRA itself, Mr. McNaught said, because of the problems entailed in devising and approving some 700 codes, and especially in classifying the various industries and trades.

"One of your own members," he said, "is subject to no less than 36 codes, with strenuous efforts being made to have that member subscribe to 12 others."

### Enforcement Too Hard

Enforcement, he said, became too much of a problem for NRA, with the result that when Richberg succeeded Gen. Hugh S. Johnson, code violations were increasing, public support was anemic, and relief rolls increasing.

NRA is now being attacked from several quarters, while its supporters defend it diffidently. Twenty-one Federal courts and the Federal Trade Commission have delivered body blows to the act, and the Schechter poultry case is now before the Supreme Court.

"The decision in the Schechter case seems inevitable," Mr. McNaught said. "The slight hope of Supreme Court support was blasted by the decisions in the Panama Refining Co. and railroad pension cases."

### Wage and Hour Agreement

He said the lower courts have preserved the distinction between interstate and within-the-state business, holding that the NRA cannot regulate within-the-state business. Employer-employee relations, the courts have held, are not interstate commerce as concerns wages and hours of service.

Should the Supreme Court hold that in the Schechter case the NRA cannot fix wages or hours, it would be a near-fatal blow to NRA, in Mr. McNaught's opinion. The court might also hold the entire NRA invalid on the ground that the powers delegated to the executive are too ill-defined to meet the requirements laid down in the Panama Refining and other cases.

As between having the whole law annulled on the delegation of power question and having it restricted by an interpretation of the commerce clause preventing establishment of minimum wages and maximum hours, Mr. McNaught said he believed NRA backers would prefer the latter. This difficulty might be ironed out later by legislation.

### Condemns Wagner Bill

Passing from the NRA to pending legislation now before Congress, Mr. McNaught was most vigorous in his condemnation of the Wagner bill, now pending action.

"Unconstitutional, subversive to industrial peace, poisonous to natural human relations," he called it, and said its passage may be the signal for "the most intensive period of industrial warfare America has ever seen."

"Its revolutionary change in the status of labor—placing virtual control of wages and hours in the hands of the Federal Labor Board, would work such a dislocation of costs and prices and so hamper business planning and disturb confidence as almost certainly to delay recovery indefinitely," he said.

"A more grossly unfair piece of legislation has seldom come before Congress."

### Violates Constitution

The bill clearly violates the third, fourth, fifth, and seventh articles of the constitution, Mr. McNaught said.

It grants to an administrative body the powers of a court, in violation of the Judiciary section; its general inquisition powers violate the search and seizure provision; by seeking to authorize complaints which can be passed on, in whole or in part, without adequate control or notice by recognized rules of evidence and by authorizing a final conclusion of fact substantially without judicial review, it violates the "due process of law" clause.

The bill, the speaker said, would grant an administrative body the power to determine the contractual rights of employer and employee, and to pass on the liabilities and rights of property with the finality of a judicial body.

It would permit assessment of damages, require restitution, without intervention of a jury, whose function it seems to perform, with review only by an appellate court, which also possess no jury and is bound only by the "facts" as found by an administrative body, uncontrolled by rules of evidence.

If passed, the bill might be shorn of its power by the courts, but for a year or two business would have a series of labor disputes, without a chance for complaint on its part, Mr. McNaught said.

On other pending legislation, some of Mr. McNaught's comments were: Social Security Legislation—"It is

based on the same legal theory underlying the AAA; if one is held illegal, the other would likewise be held illegal. This involves a problem of major importance to the government."

### Wheeler-Rayburn Bill

Wheeler-Rayburn Bill—"The 'death sentence' clause is unchanged. With reasonable and adequate regulation of all aspects of public utility enterprise that affects the public interest both regarding consumers and investors no one can quarrel. But the callous destruction of enterprises will not only mean a violation of the fundamental principles but inevitable losses to thousands of innocent investors."

"Even the threat of destruction has hurt, through postponed services and the delay of orders for construction and equipment which would produce employment."

### Thirty-Hour Week

Thirty-Hour Week Bill—"Its passage would not only hamper business flexibility to a degree undreamed of under the NRA, but would also result in increases in consumption, decreases in production, and consequent unemployment. Recovery comes only from increased, rather than decreased, production."

He ended with a plea to the administration, couched in simple language: "Let us alone. Stop experimenting. Stop spending so much. Stop punishing the banks and utilities. Give private business a chance to restore good times."

## Shipley Says NRA Retards Industry Sales, Progress

A general anti-NRA feeling pervaded the RMI meeting.

In his report to the industry, W. S. Shipley, York Ice Machinery Co., chairman of the code authority, placed only one item on the credit side of the NRA-RMI relationship—a better understanding between members of the industry, a spirit of fellowship, and a greater unity of purpose.

"While it is gratifying to note that our industry as a whole showed a substantial increase in business in 1934 (\$16,555,952 in sales, an increase of 21.9 per cent), one should be frank in recognizing that the increase is not attributable to code operation, but rather despite code operation," Mr. Shipley said.

### Outlook for Industry

"The Refrigerating Machinery Industry stands in a more fortunate position, so far as the national industrial and family life of our people is concerned, than practically any other durable goods industry."

"Refrigeration is a necessity of modern life. It is natural that sales of refrigerating machinery should show an upturn with any indication, however slight, of returning prosperity."

"The more general public acceptance of air conditioning has helped give factory production curves an upward trend, and has kept our industry from slipping as far into the red as we were in the dark days of 1932, and the almost-as-gloomy period of 1933."

### Future of Air Conditioning

"I believe that in air conditioning lies one of the most potent industrial forces for returning prosperity, certainly so far as the durable goods industries are concerned."

"However," the speaker said, "by approving a contractors' code which materially conflicts with and overlaps the Refrigerating Machinery Industry code (as well as many other codes), NRA placed decided difficulties in the way of this rapidly expanding industry, and though almost a year has passed, those difficulties have not been resolved, and probably will not be resolved, until the termination of the present NIRA on June 16, next."

"In the past, a substantial part of the income of certain manufacturers in this industry has come from the sale of ice making plants," he continued.

### Ice Industry Code

"Most of you are familiar with the famous, or probably I should say 'infamous,' Article XI of the Ice Industry code. It forbids the installation and operation of any ice plants without a certificate of permission so to do from the National Recovery Administration."

"I will not go into detail as to the history, administration, and effect of this unwarranted piece of codification, but I will say that since Article XI of the Ice Industry code has been in effect, the amount of new ice plant machinery purchased, the amount of replacement of obsolete equipment, and the amount of modernization of old ice plants have been almost negligible."

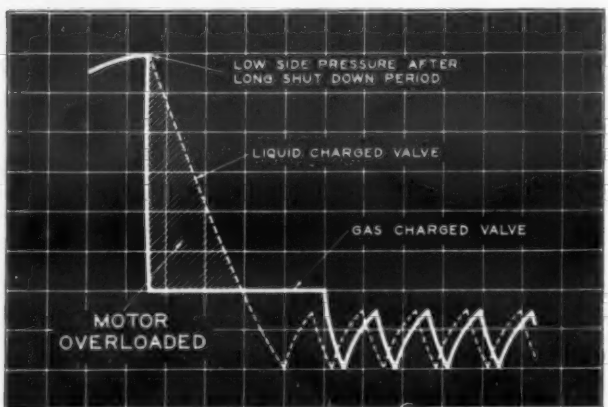
"Certainly we can say that, conservatively, Article XI, since the beginning of its operation in the early fall of 1933, has caused a loss to our industry of \$4,000,000 worth of business, and has either thrown out of employment or forced into other lines

(Concluded on Page 5, Column 1)

## Gas Charging Affords 5 Distinct Advantages In Thermostatic Expansion Valves

1. Eliminates Motor Overload On Starting
2. Limits Maximum Motor Load Under Severe Service
3. Assures Tight Valve Closure During Shutdown
4. Increases Motor Efficiency
5. Permits Oven Dehydration of Entire Unit

The chart below shows comparative performance of the GAS CHARGED and Liquid Charged Valves during "Pull-down"



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## Engineers Gathered Early Wednesday for Opening Technical Session of A.S.R.E. Meeting



At the A.S.R.E. sessions in Hotel Statler. (1) Charles M. Lee of the Cromwell Paper Co., Chicago, helps a delegate in locating a friend of his who is in the city. (2) Glenn Muffy was among the early registrants. (3) E. T. Williams of Servel, Inc., with Norval Hawkins, former Ford Motor Co. executive, a speaker at Wednesday's luncheon. (4 and 5) M. C. Terry, manager of Kelvinator's commercial applications department, thinks Mr. Hawkins' "13 fundamental principles" of successful achievement just about fill the bill.

### Heating Contractors Code Called Example Of Bungling of NRA

(Concluded from Page 4, Column 5)

of endeavor in excess of 2,500 workers formerly engaged in the manufacture of ice plant machinery.

"It is now too late for the repeal of Article XI to have any beneficial effect on the lowering of ice prices or in the increasing of machinery orders to manufacturers this year, as the season for selling ice plants or ice making equipment to go into production for the summer of 1935 is over.

"Thus, in two instances cited, NRA has proved costly to our industry."

No complaints for violation of code provisions on wages and hours of employment were received during the year just ended, Mr. Shipley reported.

One complaint was referred to the compliance division of NRA for a deliberate refusal to file prices; and 45 complaints were filed for failure to pay contributions due for the financing of the code authority's operations. Most of the latter cases, Mr. Shipley said, were ironed out amicably. He said he considered this showing as good as that of any other comparable industry.

#### Henderson Cites Problems

In his report, Secretary W. B. Henderson touched on the difficulties experienced during the past year in straightening out codes which were in conflict with the code for the RMI. No less than 20 codes, he said, were altered to exclude operations of members of the industry.

"I know you are all too familiar with the Heating, Piping, and Air Conditioning Contractors' industry code, approved by NRA for a non-representative group in the face of thousands of protests from manufacturers, and in the face of protests from NRA's own advisory board," Mr. Henderson said.

"This code, as approved, purports to control the installation not only of refrigerating and air-conditioning equipment, but almost every other form of installation involving piping known to man, with the exception of 'sprinkler systems.'

#### NRA Avoids Problem

"Although NRA approved this code for reasons best known to itself, with an apparently full knowledge of its far-reaching consequences, and although thousands of protests have been outstanding against this code for almost a year, NRA has constantly avoided resolution of the problems it has created.

"This shirking of responsibility by NRA has resulted in strikes, in delay of much-needed work, in untold annoyance and expense for those manufacturers who sufficiently felt their responsibility to customers for the performance of the equipment bearing their name and hard-won reputation to refuse to be dominated by a minority group of contractors.

#### Air Conditioning Hindered

"The growing industry of air conditioning, which these contractors seek to dominate, is one of the most potent potential factors for recovery on the industrial horizon today—but its future is being stultified and endangered by this NRA-created conflict.

"Article XI of the ice industry code, a 'control of production' provision, has also cost our industry millions of dollars in lost business," Mr. Henderson said.

John T. Cheney, deputy administrator of NRA, in addressing the luncheon meeting of RMI members, sounded a more optimistic note on future code operations.

"While the past two years of code operation have been trying," he said, "the future course can be plotted more clearly in the light of past experience and with more mutual benefit to the capital, labor, and consumer pillars of our national economic structure."

Future code operations for refrigerating machinery manufacturers are in the hands of a code authority composed of W. S. Shipley, York Ice Machinery Corp., chairman; J. I. Lyle, Carrier Engineering Corp.; J. M. Fernald, Baker Ice Machine Co., Inc.;

A. H. Baer, Carbondale Machine Corp.; D. Norris Benedict, Frick Co., Inc.; F. M. Roessing, Roessing Mfg. Co.; Emil Vilter, Vilter Mfg. Co.; and G. A. Heuser, Henry Vogt Machine Co.

These men had been in charge of code operations during the past year, and were given "permanent" standing pending decision as to the future of NRA, members feeling it would be useless to name a new group to handle an operation which had only three weeks of certain existence ahead of it. In the event NRA is continued, a new committee may possibly be named.

Other RMI code committees are: Executive—W. S. Shipley, chairman; D. Norris Benedict, J. I. Lyle, Emil Vilter.

Fair Trade Practice—Stuart E. Lauer, York Ice Machinery Corp., chairman; W. H. Aubrey, A. H. Baer, J. A. Harlan, Thornton Lewis, Emil Vilter.

Accounts—E. A. Kleinschmidt, H. S. Minster, F. M. Roessing.

Finance—D. Norris Benedict, chairman; A. H. Baer, J. M. Fernald.

Stuart Bruce McNaught, counsel for York Ice Machinery Corp., is RMI general counsel, W. B. Henderson is secretary-treasurer, and John Kirby, assistant secretary.

### Nema Plans Program To Build Markets

HOT SPRINGS, Va.—A program of business development, designed to sell more products and services for all members of Nema, and to aid in every possible way in developing their markets, was a major outgrowth of the sessions of the National Electrical Manufacturers Association here on the first three days of last week.

The program, under Nema's Business Development Committee, has as its objective "the education, by all available means, of residential and commercial users of electricity, so that they may appreciate the usefulness, economy, and efficiency of electricity and electrical products as servants in the home, and as tools in the carrying out of the various operations performed in all types of industrial and commercial establishments."

Basic principles underlying the program are:

1. It will cover a period of not less than three years. In a program undertaken for a shorter period, immediate results are too often expected, and the disappointment resulting frequently militates against the success of the operation.

2. It will be started on a moderate and conservative basis, will be budgeted for the accomplishment of reasonable results, and is subject to modification in accordance with changing conditions.

In line with the basic principle of conservatism and moderation, the program will start with a few general activities, requiring little or no additions to Nema's headquarters staff, and involving no great additional expense. These initial activities will include:

A program to promote adequate wiring in residential and commercial fields.

The development of a program to promote a friendly relationship with the architects and builders throughout the country, so that they would welcome and accept information which would insure more complete electrification of homes, offices, stores, and factories.

Contacting and assisting the groups of electrical maintenance engineers which have been organized in certain of the country's industrial centers, in the realization that they are an important medium for promoting modernization of commercial buildings by the installation and utilization of up-to-date machinery and equipment.

A program of active cooperation with electric leagues throughout the country, to assist them in reorganizing the League Council, and aiding, in every possible way, in coordinating their activities and keeping them informed of business-building projects which they can institute in the interests of their members.

Complete cooperation with national associations and member companies of other major groups in the electrical industry.

A program for developing better

mutual understanding between utilities and other retailers.

The general program is designed to give full consideration to the rights and interests of all electrical manufacturers who are members of Nema, as well as to all other factors in the electrical industry—utilities, wholesaling, contractors, and dealers.

Only Nema members can participate in the business building program, and, as far as is possible, benefits will be confined to them.

The committee planning the program, appointed by President F. C. Jones early this year, worked with a Residential sub-committee and a Commercial sub-committee, named a short time later.

Recommendations for second programs are in the hands of a steering committee, made up from the membership of the two sub-committees, and in whose hands is placed responsibility for general supervision of the Nema program.

On the steering committee handling the business development program are C. E. Swartzbaugh, chairman; S. L. Nicholson, vice chairman; H. J.

Mauger, B. W. Kerr, D. H. Murphy, R. W. Staud, A. G. Newton, and Harvey Hubbell, Jr.

The residential sub-committee is composed of H. J. Mauger, chairman; D. E. Murphy, A. G. Newton, Harvey Hubbell, Jr., D. G. Phelps, M. J. O'Hara, H. F. Barnes, and C. E. Swartzbaugh.

R. W. Staud is chairman of the commercial sub-committee, which includes L. D. Meeker, B. W. Kerr, E. H. Cheney, L. W. Mercer, F. C. Hodgkinson, and J. A. Harlan.

The present Nema headquarters staff will be reassigned to enable them to assist in carrying on the business development program. This will obviate, for the time being at least, any major increase in the headquarters personnel.

One of the program's activities, however, the Architects' Service Bureau, will be placed in the hands of an experienced architect, who understands the problems connected with this field, and can make a more effective approach.

Any additional expense entailed in the program during the first year will

be underwritten from the Nema contingency fund, as long as it does not exceed \$15,000. This extra operating cost will be allocated among members on the basis of service, and replaced in the contingency fund so as to keep it intact.

### Modern Home Utilities Puts 5th Kitchen in Use

WATERBURY, Conn. — Modern Home Utilities, Inc., Connecticut distributor for General Electric kitchen appliances, recently installed a complete G-E kitchen in its institute room here. Miss Hazel M. Fletcher, home service director for the distributorship, held a cooking demonstration on the opening day.

The organization has installed electric kitchens in each of its five retail stores, located at Hartford, New Haven, Waterbury, New London, and Middletown, Conn.

Miss Fletcher plans to hold demonstrations every two weeks in the new Waterbury kitchen.

## UTILITY

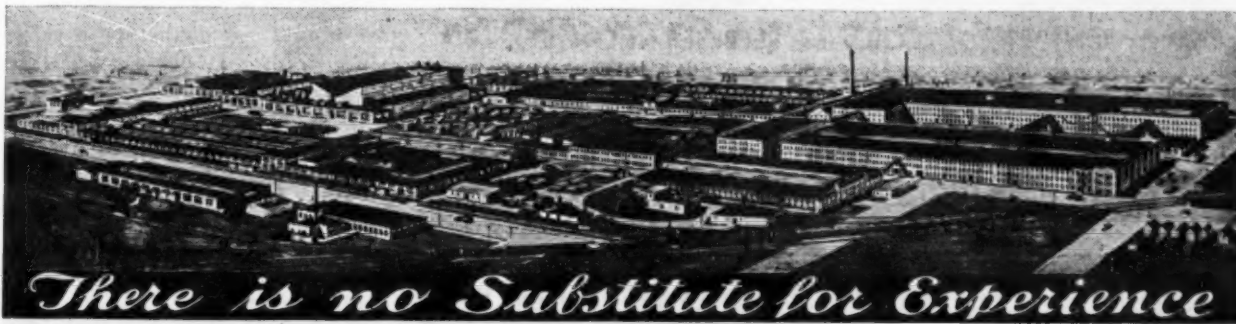
Servel equipment, from the smallest compressor to the largest air conditioning unit, is built to be used. Every unit combines in the simplest possible form all of the elements necessary to serve the customer constantly, efficiently, without faltering. Servel offers variety to fit every job, flexibility to meet widely varying conditions, and backbone to stand up and "take it." Practical day-after-day performance pleases customers long after frills and talking points are forgotten.

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## AIR CONDITIONING

### Bloom Predicts Contraction in Size of Air-Conditioning Equipment and Smaller Dry Bulb Differential

By Phil B. Redeker

DETROIT — Prediction that the contraction in size of air-conditioning equipment may reach the point where the ducts distributing conditioned air will be no larger than the size of pneumatic tubes, such as are used in department stores, or even as small as 3/4-inch conduit, was made by S. C. Bloom, consulting engineer of Chicago, in addressing the opening technical session last Wednesday of the Spring meeting of the A. S. R. E. here on the subject "Some Trends in Air Conditioning."

In such a system the air would be circulated at velocities five or six times the velocities employed in present practice, Mr. Bloom declared. There would be no recirculation of the air from the room being conditioned, the air being allowed to escape through normal channels.

With this system, Mr. Bloom pointed out, a pressure would be built up in the room which would eliminate heat loss through infiltration of outside air.

Air-conditioning engineers are coming to realize that systems should be designed to accomplish more dehumidification and less reduction in sensible heat, Mr. Bloom averred.

"A reduction in dry bulb temperatures of from 10 to 15° F. is sufficient," stated Mr. Bloom. "This will result in

no shock to the system when the occupant of an air-conditioned room or patron of an air-conditioned store goes outside, and will lessen complaints from users, a matter of considerable importance to the progress of the industry."

Investigations which are demonstrating that the amount of outside air which must be introduced is considerably less than was previously thought necessary (some believe it to be as low as 2 c.f.m. per person) will result in reduced first costs (because smaller equipment will be used) and reduced operating expense (because the heat load will be less) Mr. Bloom stated.

Mr. Bloom warned, however, that the air-conditioning industry must be prepared to fight antiquated health ordinances which call for introduction of volumes of fresh air which are, in the light of recent investigations, ridiculous.

"Air-conditioning engineers installing systems are disregarding these ordinances right and left, and while they haven't run into any difficulties with the law so far, they may some day if the ordinances are removed or revised," the speaker declared.

The air-conditioning industry has done an outstanding job in the past few years in developing units which

### Kelvinator Conditioners on Display at Chicago Show



K. C. Porter, air-conditioning engineer of the Commonwealth Edison Co., Chicago, demonstrates the features of the new Kelvinator room-cooling unit (with glass panel so parts may be seen) to a visitor at the Fourth Annual Chicago Air-Conditioning Show, held in the main electric shop of the Commonwealth Edison Co.

are marked by their beauty, utility, and compactness, Mr. Bloom remarked, but stated that the big factor in getting business men and home owners to buy air conditioning is a reduction in first cost.

#### Flexibility Important

"Development of 12 medium-sized condensing units to cool a department store is significant of a trend in design," said Mr. Bloom.

"The installation of these units will be marked by a flexibility in the operation of the system—some of the units automatically shutting down when the load is not so great, and all of the machines operating at their maximum capacity when there is a peak load.

"Units of this type lend themselves to mass production and easy installation, lowering costs and the market base.

"The facility with which parts for such units can be stocked and replaced is also important."

Advancements in the design of extended surface cooling units for air conditioning has put spray-type systems into the background, but the latter haven't passed into the limbo of forgotten things by any means, Mr. Bloom reported.

#### Spray Systems May Return

Spray-type systems have definite advantages for some types of applications, said Mr. Bloom, and when they are made more compact and more durable they will again assume an important place in air-conditioning work.

Mr. Bloom also predicted that carbon dioxide systems would regain a place of importance when it becomes fully realized that a low relative humidity is what is really desired in summer air conditioning.

The air-conditioning industry owes a debt to operators of motion picture houses throughout the country, Mr. Bloom declared in recalling that the 16th anniversary of the first installation of an air-conditioning system in a movie theater will be celebrated next month.

The movies made the public air-conditioning conscious, the speaker said, and now air conditioning is essential in all movie houses because the public demands it.

In the lively discussion that followed Mr. Bloom's address, several matters of importance were brought to light.

#### Air Introduced Colder

In amplifying his statement that smaller distributing ducts will be used in the future, Mr. Bloom declared that one of the present day fallacies in air-conditioning theory is that air should not be introduced into a room at more than 8 to 10° F. below the temperature of the room.

"In one factory installation which I designed the air is introduced at temperatures which are sometimes 50° F. below that of the room temperature. This cold air is introduced in relatively smaller volumes than would be found in the usual air-conditioning system.

"One of the advantages of this type of installation is that it is easier to handle a small column of air than a large column."

#### Air Conditioning as Life Prolonger

Dr. E. Vernon Hill, well-known Chicago consultant on air conditioning and doctor of medicine, made the prediction that the mass installation of air-conditioning systems in homes, factories, and offices will result in a considerable prolongation of the average life of man.

"We have eliminated the fear of epidemics that come from food and

water by conditioning our food and water, but the greatest number of deaths come from respiratory diseases, which we can defeat by conditioning the air.

"Death is an accident. Experimental medicine has demonstrated that there is no reason why cell life, if given proper food and conditions, cannot live forever."

A. R. Stevenson, General Electric engineer, offered some interesting data on the subject of the amount of fresh air needed for proper odor control.

People have been found who objected to foul odors in air-conditioned Pullman cars when only 5 c.f.m. of outside air per person was being introduced, but who made no objection when 10 c.f.m. of outside air per person was introduced.

### Air-Conditioning Solves 'Summer Slump' for Beauty Parlor

KANSAS CITY—Air conditioning solved the summer slump problem of the Marie Earle Beauty Salon, located in the Country Club Plaza, residential section here, states Mrs. Marie McGavran, owner and proprietor of the beauty salon.

Year-round air-conditioning equipment was installed by York Ice Machinery Corp. The central system air conditioner, installed in the basement, combines, in a single unit, the fan, the double duty heating and cooling surface by which the apparatus may be converted to winter heating use, and a mist-type humidifier and air filter.

Mounted in the base of the unit is a 5-hp. York water-cooled condensing unit.

"The installation was made in May, 1934," states Mrs. McGavran, "and most of the equipment was put in on a Sunday, so that there was no interruption in any way of our regular shop services. During the hot months last summer, we doubled our salon business, over the same period of the year before.

"Air conditioning," says Mrs. McGavran, "provides comfort for our customers and operators. We regulate the temperature of our salon so that it will not be too cool in comparison with outside temperature. We keep it around 80° F., sometimes permitting it to rise as high as 84° F. when the outside temperature is 110° F. or above, as frequently happens here in Kansas City, you know."

An interesting sidelight on the results of air conditioning in her beauty salon was related by Mrs. McGavran as follows:

"One of our newer customers," she said, "is a sufferer from hay fever. She heard about our air-conditioning installation, and came to our shop to have her beauty work done. She found such relief from her affliction in our salon that she insisted on having the same type of air-conditioning equipment installed in the new home she and her husband built last fall."

Before the installation of air conditioning, Mrs. McGavran said that summer meant "such stifling, breathless weather, that our work was real drudgery, with customer after customer cancelling appointments because of the hot weather, exhausted operators, increased drying periods because of high humidity, and a consequent shrinkage in our shop receipts. With air conditioning, however, drying periods can be regulated, and better results obtained. Our operators are more contented, and find it easier to please their customers."

### Haven Reports Tests On Window Glass Insulation

DETROIT—Results of experiments in proper design of double-thickness glass for commercial refrigerators or windows in air conditioned houses were described by C. D. Haven, president of the Thermopane Co., in his address before the opening technical session of the A.S.R.E. meeting here last week.

No hermetically sealed glass air space is possible where the width between the two thicknesses of glass is from 1 1/2 to 2 inches, Mr. Haven stated. Temperature differences with such construction would result in either a leak or cracking of the glass.

Maximum width of the space between the two thicknesses of glass should be not more than 1/4 inch, tests demonstrated. Construction must be air tight and vapor tight under long periods of varying temperatures and pressures to be effective, he said.

There is a fundamental relationship between the thickness of the glass, width of air space, and length of the glass, Mr. Haven pointed out. With 1/4 inch air space and lengths of glass above 30 feet, polished glass can be used.

In lengths less than 30 inches 1/4 inch single strength and double strength glass is recommended.

Territorial differences with respect to average relative humidities, pressure and barometrical factors need to be taken into account, the speaker averred. A design that operated perfectly in Minnesota might not stand up at all in Texas, he pointed out.

Use of sheet metal construction on the sides of double-thickness glass construction allows for expansion in the air space and reduces the danger of cracking, Mr. Haven declared.

In discussing the use of double-thickness glass in air-conditioned dwellings, Mr. Haven warned against factors which tend to "fog" up the windows.

"Humidity shouldn't be oversold in selling air conditioning if it will result in fogging up windows," Mr. Haven warned. "A housewife may not care so much if she doesn't have perfect humidity conditions, but she will certainly be mad if she can't see out of her windows."

Anything which bottles up air near the glass tends to decrease the temperature and result in condensation of moisture on the glass, it was pointed out.

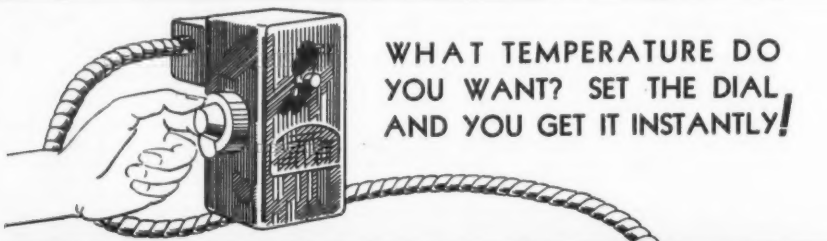
Installations designed to provide a more free circulation of air by the glass is one answer to the problem of condensation.

### St. Louis Undertaking Firm Buys 2 Conditioners

ST. LOUIS—Air-conditioning equipment has been installed by the Sodemann Heat & Power Co. here for Alexander & Sons, local funeral directors.

The chapel is cooled and supplied with fresh filtered air by a unit located in an adjoining room. By a system of ducts in the walls, the conditioned air passes through narrow grilles located above the pulpit into the chapel and into a service room on the first floor.

On the second floor, two rooms are cooled by means of a unit similar to the one downstairs. Thermostats have been installed to provide the exact amount of cool, conditioned air required by each room.



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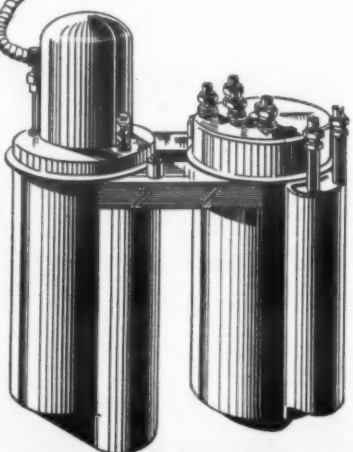
"Its efficiency and its superiority are immediately apparent. It doesn't take a long sales argument to get the order. We're selling more and more of them AND EVERY ONE SOLD BRINGS US A GENEROUS EXTRA PROFIT."

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# COLTROL

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## Thousands of Chicagoans See 1935 Equipment at Annual Air-Conditioning Show



(Left) Typical of the interesting and instructive booths at the Fourth Annual Chicago Air-Conditioning Show, visited by thousands of Chicagoans, were the Strang and Ilg exhibits. (Right) William P. Rock, Commonwealth Edison Co. air-conditioning engineer, explains a Fairbanks-Morse unit to Josephine Trudeau. In the background are Frigidaire and Lipman booths.

### Uniformity of 'Sales Procedure' Needed in Air-Conditioning Industry Now—Knighton

**Editor's Note:** The following paper was read before the second annual conference of the Southeastern Electrical Exchange at Augusta, on April 19 by J. K. Knighton, sales manager of the air-conditioning division of Kelvinator Corp., Detroit.

I WANT to talk about air conditioning as it stands today—as a new business—separate and distinct from any other activity in one sense—and yet a very definite part of our existing business in another. The electric utility plays a most important role in the proper development and guidance of this new industry—and with this thought in mind we earnestly seek your cooperation.

In this discussion I hope to illustrate the necessity for—and possibly the most desirable methods to effect real, tangible results.

Air conditioning—true air conditioning—is the science of controlling the temperature, humidity, motion and cleanliness of the air within an enclosure. It includes four major functions—temperature (heating and, or, cooling); humidity (humidifying and, or dehumidifying); motion (proper distribution of the conditioned air); and cleanliness (filtering, cleaning, supplying sufficient new air, etc.).

Today public acceptance of the term however implies summer comfort cooling only, and from here on in this discussion we deal primarily with this particular phase of the business.

#### Distinctly Separate Industry

Now, back to my contradictory statement about how this new business fits into one picture. First, why is air conditioning a distinctly separate business? Because it is a new type of activity—the proper handling of air for comfort and for health in all its phases. Every application is different—requiring resourceful engineering, and intelligent sales effort. Then too, public acceptance of the idea requires specialty selling methods.

Why is it then, such a definite part of our existing business? Because of our experience in the automatic control of temperature and humidity—our manufacturing facilities and our distribution through organizations experienced in the art of specialty selling all are so well adapted to carrying on the promotion and sale of air conditioning.

I would like to discuss this factor of distribution a little more in detail as it relates to this business. In seeking avenues of distribution for air conditioning apparatus today there are four major qualities one must look for. They are: (1) financial ability, (2) sales ability, (3) prestige, and (4) engineering ability.

#### Existing Organizations as Outlets

Existing organizations then are the logical outlets—established companies that are financially sound, have proven sales ability, sales minded management, entrenched in their communities with a prestige that is so valuable in the sale of air-conditioning apparatus today.

They may be lacking in one quality perhaps—engineering—but this is one quality that can be most easily and quickly procured or purchased, to complete a good air conditioning operation.

For just a few moments I would like to touch briefly on the "Need" and "Market."

Air conditioning is a necessity wherever additional heat is introduced into an enclosure from sources such as body heat, electrical energy, steam, hot water, etc., to such an extent as to produce discomfort.

The theater owner was probably the first to recognize this problem and later retail merchants of many types began to adopt air conditioning as the major means of attracting new business, increasing individual sales, and bringing about increased net profits. It naturally follows then that the pioneer merchant installing air conditioning soon forces his serious competitor to do likewise. Hence, from the commercial angle, air conditioning is quickly becoming a necessity.

#### Luxury Today—Necessity Tomorrow

Air conditioning in the residence and office is still somewhat in the luxury classification, except in its application to health. However, our necessities of today, with the exception of bare essentials such as food, clothing, and shelter, had their start as luxuries, and then, through usage, became necessities.

The time we spend eating, shopping, and working in air-conditioned spaces will be the answer as to when we will have such equipment in our homes.

#### Classification of Market

The market can be divided into three classifications: commercial, domestic, and industrial. I am sure you recognize the market possibilities so I will not take up your time to elaborate on this particular subject. Realizing the need and recognizing the market—how are we going to locate the prospect?

The principal methods include canvassing, advertising (national and local), direct by mail (selective), exhibits (model homes and model offices), special, seasonable promotional campaigns. In my observation of this business over the past few years, I have come to the conclusion that a practical, sane, safe sales method is about the most desirable thing that could and should be injected into the general scheme at this time.

#### Fumbling Salesmen Hurt Industry

In this connection I will say that without such a plan you are apt to find so-called air-conditioning salesmen stumbling about blindly with the net result that because of their activity—because of their ignorance of the job to be done, and its resultant benefits—they cause more people not to buy than do.

It is not uncommon in cities where such lax conditions prevail to find four or five competitive salesmen attempting to sell a good prospect equipment for a given space, all figuring on the same job, the same load factors, and yet varying as much as 500 per cent in the tonnage factor, the equipment, and the selling price.

What happens? Why the prospect loses confidence in all air conditioning—he is scared out and decides to wait.

#### 'Sales Procedure' Big Need

That is why I say "Sales Procedure" stands out as the big job to be done now. You know in this business of

air conditioning we are not selling machinery, we are selling and the customer is buying, a predetermined condition of the atmosphere within an enclosure.

That being the case, the prospect must have faith in this business—faith in the seller, whoever it might be. That faith will either be blind or based on fact and if this business is ever to become the volume business that its potential warrants—and it will—

then our sales procedure and our sales methods must be such as to permit public faith based on fact.

That is the problem of the entire industry and, I believe, is being recognized as such by the larger and more responsible units of the industry. Naturally I cannot speak for the industry or what its other members are planning in order to meet this situation. But I can outline what Kelvinator Corp. itself has decided to do in

order to both realize to the utmost on the great potential market which is open to air conditioning and to contribute to the growth of this new industry.

Our program has been outlined to include the following points:

First, we believe explicitly in a sound product with functional features. Our engineering department has been constantly at work perfecting a (Concluded on Page 8, Column 1)

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AND REDUCE COST OF  
FABRICATED TUBE PARTS**

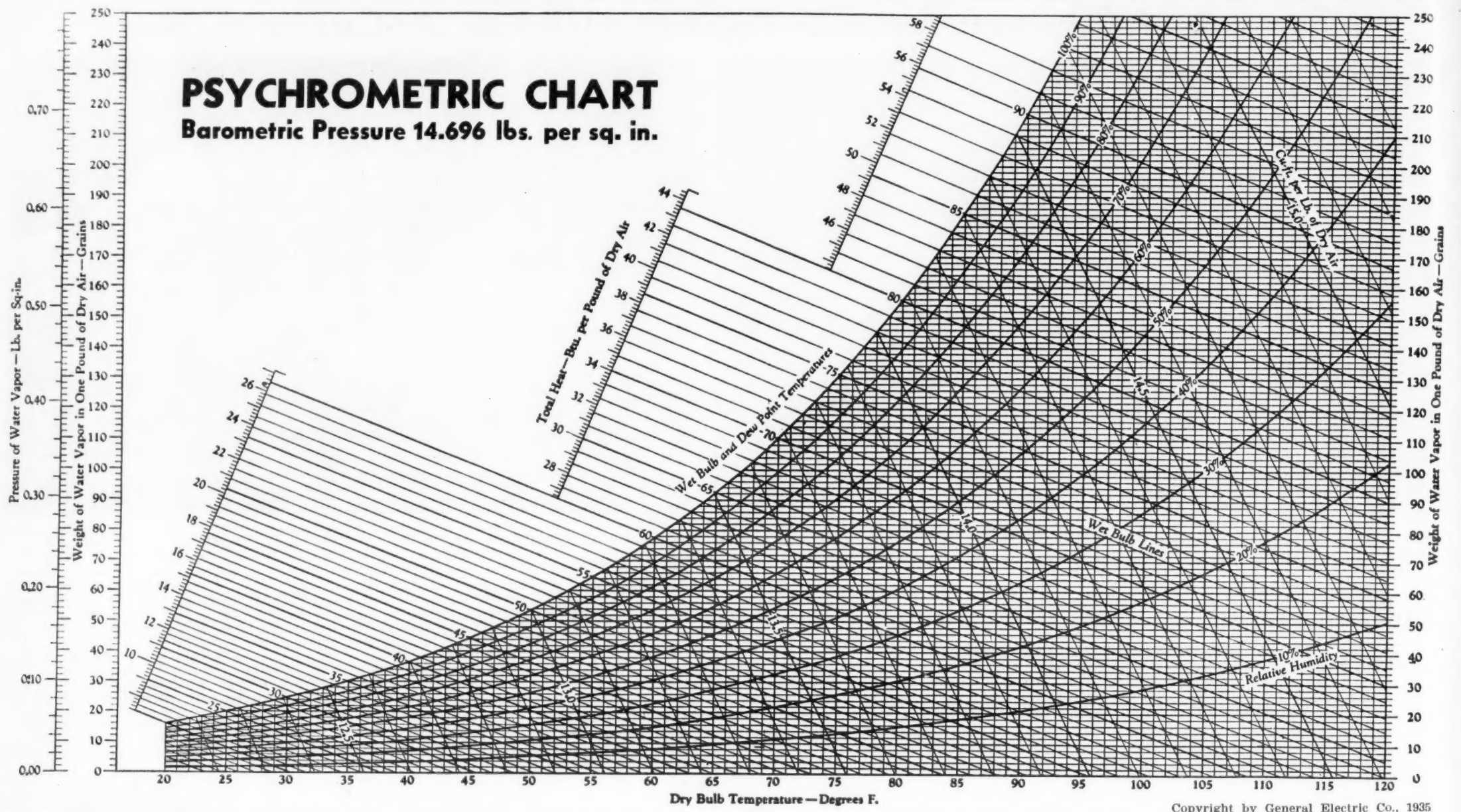
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SEAMLESS COPPER BRASS & ALUMINUM  
DETROIT MICHIGAN





### Sales Procedure Is Industry Need Now, Knighton Declares

(Concluded from Page 7, Column 5)

line of air-conditioning equipment for meeting the demands of virtually every type of application in the most efficient and economical method possible. Five years in field test activity lie behind our present line of products.

Second, we recognize the need for a distributing organization mindful of its responsibilities in connection with the future of this new air-conditioning industry. Our engineers who contact prospective buyers must be thoroughly trained in the fundamental principles of air conditioning. Our distributors must provide this high type of engineering service to prospective buyers in order that confidence may be built not only in our own company and its products, but in the whole air conditioning idea.

Third, the sales organization also must be thoroughly trained to sell air conditioning. Salesmen must have an accurate understanding of the prospect's needs—an appreciation of the value of air conditioning and the ability to translate the selling price in terms of value for the prospects. And in this last connection let me add this—whatever its application—today air conditioning is cheap.

For example take the retail merchant who is increasing his business 25 to 30 per cent with air conditioning. By what other method can he spend a few thousand dollars and accomplish the same thing? There is none. Therefore air conditioning is the

most inexpensive thing he can do for the promotion of his own business.

In the subject of health, hay fever for instance, the value of air conditioning is just as apparent. Mr. Hay Fever sufferer, how much money have you spent trying to effect relief? Three—four—or five thousand dollars? Then the few hundred dollars I am asking for this equipment in your bedroom is the cheapest thing you can do to obtain relief. Purely as a luxury in your home or office, it's the cheapest luxury you can buy.

That is specialty selling, selling an appreciation of the benefits and service of air conditioning rather than selling the equipment itself. It is the kind of selling we think is the right answer for making this volume business.

It is in definite contrast to contract selling where the prospective buyer of equipment, seeks out the lowest bidder for a certain standardized set of equipment for his needs. We have so much more to sell than machinery, for true air conditioning today demands a highly technical knowledge of all factors involved in each particular problem before equipment can be specified.

To make the prospect realize this and appreciate the fact that air conditioning is a service and not some equipment, is the modern air-conditioning salesman's job.

This new industry, air conditioning, presents a particularly attractive picture from the viewpoint of the public utility executive. The electric utility plays a most important role in the proper development and guidance of this new industry. The very nature of your business is such that a definite share of the responsibility rests with you.

Briefly, this responsibility is guid-

ance—not from a design or manufacturing standpoint—not from an application's engineering angle—but from the standpoint of "sales procedure" including practical sales methods, sane sales practices, building public confidence, good will, and acceptance.

There are several different ways this can be accomplished. Cooperative planning and direct selling have their place in the picture. The selection of one or the other depends entirely upon local conditions. The former, cooperative planning, is probably the most effective in larger metropolitan areas and to be effective it is more expensive because passive cooperation will not increase the business 10 per cent.

Active cooperation, however, is invaluable. Active cooperation that will build public confidence and acceptance through newspaper, outdoor, and radio advertising. Active support of an organized effort to maintain sane sales practices has an equally important place in the picture.

#### Active Selling Necessary

As to direct selling in more sparsely settled country and provincial areas, no dealer such as we know today has sufficient air conditioning potential to warrant the set-up necessary to handle this business. That would curtail a trained air-conditioning engineer, trained air-conditioning salesman plus the advertising and promotional effort necessary to become established.

Therefore, if air conditioning is to get started in such communities this year, it is up to the electric utilities to sell actively, engineer, and install air-conditioning equipment themselves, and in so doing conduct their activities on such a basis that the sales procedure itself constitutes a guide for the balance of the industry operating in that territory.

An electric utility organization which accepts this responsibility for the promotion and guidance of an industry which promises to become such an attractive source of additional load, should recognize early the importance of demonstrating what air conditioning really is.

There is no better way than the installation of actual air-conditioned display rooms where prospective buyers can see and feel for themselves what modern air-conditioning equipment, scientifically installed, can deliver in the way of true air-conditioning service. There is a crying need for this kind of actual demonstration. Your own display rooms offer the best possible locations for this type of demonstration.

#### Lipman Sells Two Air Conditioners to Hotel

KANSAS CITY — Kansas City distributor for General Refrigeration Sales Co. recently reported the installation of two model 10-4000 air conditioners for use in cooling a coffee shop, lobby, dining room, and private dining room of a local hotel.

### G-E Develops New Psychrometric Chart For Easy Reading of Important Data

By Phil B. Redeker

DETROIT—General Electric's new psychrometric chart, designed so that those using it might read it as easily and quickly as possible, but which does not sacrifice accuracy to achieve this end, was described and explained by F. O. Urban of the General Electric Co. at the opening technical session of the Spring meeting of the American Society of Refrigerating Engineers held here last week.

"Our new chart, developed for calculations on air-conditioning problems, differs from others in two respects: (1) it is drawn from new calculations; (2) the arrangement of lines and scales are new in some respects," said Mr. Urban.

"In connection with our work we found it desirable to have a psychrometric chart from which the various properties of the air could be read directly, and on which the important air-conditioning processes could be represented by straight lines.

"With these requirements in mind, it was decided to use rectangular coordinates, with dry bulb temperatures on the abscissa and moisture content on the ordinate."

In General Electric's psychrometric chart the wet bulb temperature lines serve also as the constant total heat lines. Although there is a slight error involved in doing this, Mr. Urban pointed out, it is not of enough consequence when dealing with the temperatures ordinarily used in air-conditioning work to be of importance.

The addition of the total heat scale and specific volume lines made for direct reading. The vapor pressure scale was added to make the chart complete.

To illustrate the use of the chart Mr. Urban gave the following example:

"For a cooling application in an air-conditioning system let us imagine extreme outdoor conditions of 96° wet bulb and 75° dry bulb with 3,000 c.f.m. of outdoor air being introduced. "Indoor conditions being maintained are 80° dry bulb and 67° wet bulb. "Our problem is to find the total heat gain and to see how it is divided in terms of sensible heat and latent heat.

"The total heat value of the outdoor air, according to our chart, is 38.5 B.t.u.'s. For the indoor air the total heat value is 31.5 B.t.u.'s. The difference is 7 B.t.u.'s.

"Dividing the total cubic feet per hour of outside air introduced, (180,000 c.f.m.) by the specific volume factor for the stated outside air conditions (14.3) we get 12,600 lbs. of air per hour. Multiplying this by 7 we get 88,000 B.t.u.'s per hour, the amount of heat to be extracted to bring the outside air to the indoor air conditions which we are maintaining.

"To find how this heat load is divided between latent heat and sensible heat we find the point where the dry

bulb line for the outdoor conditions intersects the dew point, or absolute humidity, for the indoor air.

"Reading along the total heat line from this point we get a total heat value of 35.5, so to condense moisture from the outdoor air without any sensible cooling requires the extraction of 38.5 minus 35.5 or 3 B.t.u.'s per hour.

"Subtracting 3 from our total difference between indoor and outdoor conditions of 7 B.t.u.'s we get 4 B.t.u.'s, or the amount of sensible heat removed.

"By this division we see that the amount of heat to be removed by dehumidification is 12,600 multiplied by 3 or approximately 38,000 B.t.u.'s per hour, and the sensible heat to be removed is 12,600 multiplied by 4 or a little more than 50,000 B.t.u.'s per hour.

"Suppose the 3,000 c.f.m. of outside air is mixed with 9,000 c.f.m. of recirculated air from the room being conditioned.

"To find the heat value for the air entering the air conditioner under these conditions draw a line from the intersecting point of wet and dry bulb temperatures for the indoor conditions to the similar point for outdoor conditions. Find the percentage of outside air to the total amount of air in the mixture.

"Place a point on the line which you have drawn so that the ratio of its distance from the point for indoor conditions to the distance between the points for indoor and outdoor conditions is equal to the calculated ratio of air quantities. Follow the wet bulb line from this point to get the total heat of the air entering the air conditioner—33.3 B.t.u.'s."

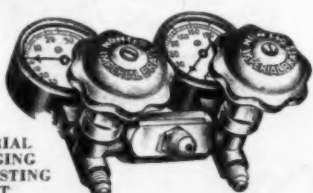
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## Engineers Hear Former Ford Executive Discuss Elements of Successful Management



Scenes at the Wednesday A.S.R.E. luncheon. (1) C. T. Baker, Atlanta (Ga.) consulting engineer, leaves no doubt as to what he thinks of Norval Hawkins' analysis of the human factor in business life. (2 and 3) "I think he's absolutely right," Dr. A. J. Goosman tells Samuel Bloom. "Sure thing," says Mr. Bloom. "Now, I remember a fellow . . ." (4 and 5) Two Detroit Lubricator men—Dick Townsend and Dan Wile—hear Mr. Hawkins describe the ideal workman, and wonder where they can find a few.

### Hawkins Cites Importance of Human Factor in Business at Welcome Luncheon for A.S.R.E.

DETROIT—"Man in management constitutes the only difficult factor in business," declared Norval Hawkins, former Ford Motor Co. executive, in a luncheon talk before the American Society of Refrigerating Engineers at the Statler hotel here last Wednesday (May 22).

Mr. Hawkins quoted an industrial leader as having once said:

"Were I compelled to choose between great executive ability, mechanical skill—and a likeable, tactful, human personality, I would choose the latter every time; for a man with such a personality can create efficiency surpassing the efficiency produced by men who possess a high degree of skill or great executive ability, but lacking in the human element. And when the head of a business is so fortunate as to find all these qualities in one manager, he ought to thank God every day for his blessings."

#### Man Is 'Unknown Quantity'

The common factor with which one has to deal is human nature, he averred. Man is the "unknown quantity" in management because he is the only factor in industry that has within himself the power of changing. Things, said Mr. Hawkins, have no inherent capability for altering themselves in even the slightest degree, and are thus easily handled.

"Man has the power of continual and unlimited change," he continued. "Told to do one thing he may do any of 50 other things instead. He cannot be depended upon until he has been proven thoroughly, and even then is apt to make mistakes. He does not always function like a cog in the business machine. At any moment, he may turn into a 'monkey wrench' among the gears and wreck the organization."

#### Individuality Is Variable

No matter how completely a man has been instructed, believes Mr. Hawkins, or how ably he is directed, his efficiency depends upon a variable factor—his individuality, with its powers for infinite change upon his own initiative. The man can ignore his instructions, and disobey or alter his directions. Consequently the problems of management are complicated by the multiplicity of the men to be managed.

"With practically inexhaustible resources of our principal raw materials, with the greatest wealth among all the nations, with the best man stock and the highest average of intelligence on earth," he declared, "only one thing can prevent us from quickly recovering, that is poor management."

#### Developing Exact Science

"Without surrendering our individuality we also can and will work out a voluntary standardization of business methods for our common good. Industrial management is being developed into almost an exact science, so far as the fundamental principles are concerned. And more and more we are learning to apply the common right principles surely in our different businesses."

The efficient industrial manager is thus an absolutely essential factor in bringing business back, stated Mr. Hawkins. The primary importance of his functions has been recognized both in our present governmental reorganization along business lines, and in the plans now being perfected for a commercial reorganization which we foresee the necessity to meet.

#### Many Factors to Manage

"The problem of the executive," he averred, "is how to manage superintendents, the foremen, the workmen in the shop, the office boys, the clerks, and stenographers, the salesmen, the department heads, his personal assistants, and private secretary—all the different human factors with whom he must deal in trying to solve the problems of successful management."

"Most business men," he continued, "dream of the '100 per cent efficient' employee, but cannot imagine him as a reality; so they have not attempted to envision him clearly. The 'star' is

attainable. He is in sight of modern business perception, and some keen eyes have analyzed of what he is made."

The ideal workman, according to Mr. Hawkins, should have the following five essential elements: satisfaction with his job and pay; perfect physical condition; mental ability and activity; emotive fellow-feeling; and spiritual vision.

#### All Factors Important

"The whole problem of man in management," he asserted, "is impossible to solve if any of the five essential factors is lacking."

"Supervision cannot be sufficient unless it is thoroughly informed. First, the whole organization should be charted, so that every individual unit may be fitted into his appropriate place and his relations to every other unit be clearly defined."

"There should be a simple yet complete system of record-keeping which will supply the supervising authority with the tools of facts for doing his work. Guesses have no proper place in right industrial management."

#### Actuate Supervision by Feeling

"Some managers become obsessed by figures. They elaborate accounting methods, their costs are determined to fractions of a cent, they know down to minute decimals the proportions of various elements of overhead expense, their purchasing departments are models of accuracy, they have graphic charts to show work in progress, they can trace orders swiftly and surely—yet their supervision of the operations of the business is merely machine-like."

"Supervision must be actuated primarily by feeling, not by figures," Mr. Hawkins asserted. "Cold facts need to be translated into warmly human terms. The first desideratum of supervision should be contentment of the worker, and the second should be the elimination of all red tape. Low costs and high production should follow these conditions. The task of supervision will be comparatively easy for the industrial manager who thinks first of the worker and second of the work."

#### Emerson's Influence

Harrington Emerson, industrial engineer and philosopher, according to Mr. Hawkins, may be regarded as one of the central figures in the rise of the so-called scientific management or efficiency era of business.

"He was the first to compel the attention of the world to the subject of eliminating industrial waste," Mr. Hawkins averred. "Second, he was the first to try out the principles of efficiency by applying them to the greatest varieties of industries and professions. Third, he was the most tireless trainer of men and counsellor of experts, being the only member of the original efficiency group who had engineering and pedagogic education."

In conclusion, Mr. Hawkins quoted the 13 fundamental principles underlying successful handling of any job, department, or business as evolved by Harrington Emerson.

Prior to enumerating the principles, however, Mr. Hawkins warned that "before these fundamentals can be used, it is necessary to establish standards of performance in our life and work. We must be able to break our entire job down into its component or divisible parts, and establish standards of performance for each one of them."

#### Fundamental Principles

The 13 fundamental principles for successful achievement are quoted in the following paragraphs. The first seven are the mechanical ones that have to do with proper use of materials and equipment. The remaining six are ethical, mental, moral, or man-building principles.

"The first one is known as the intelligent and discriminating use of Records. All business is a continual hunt for the necessary information. Records substitute accurate knowledge for guesswork. They locate and measure waste."

"The second one is Plans. Lack of preparation and foresight is one of the biggest bars to progress. The application of this principle helps develop vision, initiative, and the two kinds of imagination."

"The third principle is Scheduling. The application of this principle makes plans definite and workable, and develops power of concentrated effort."

"The fourth is Despatching. This principle kills procrastination and compels the use of the power of decision."

#### Standardized Conditions

"The fifth principle is Standardized Conditions. This one means to alternate routine with initiative—to find the best place for everything and keep it in that place."

"The sixth is Standardized Operations. This means to find, fix, focus, face, and follow the facts."

"The seventh is Written Standard Practice Instructions."

"The eighth principle is Ideals. This

one determines the definite aims or purposes, and develops the mental attitude that leads to achievement."

"The ninth, Common Sense, is the keynote of efficiency. It shows how to avoid wrong judgment and cultivate sound decision and right feelings."

#### Competent Counsel

"The tenth is Competent Counsel. No one person can know it all. We must know how to get information when we need it, and we want it, and how to profit from our own and others' past mistakes."

"The eleventh principle is Discipline. This one means the training of the will, cultivating self-control, and learning how to apply the laws of self-management."

"The twelfth is the Fair Deal. Learn to apply this principle to things with relation to other people and yourself."

"The thirteenth is Efficiency Reward. You must know how to eagerly desire, earnestly see, and insistently demand for yourself, the rewards for application of the other 12 principles."

### Former Distributor for Kelvinator Dies

BALTIMORE—Nelson C. Tobey, president of Montgomery Electric Co., Inc., former Baltimore distributor for Kelvinator, and vice president for Barber & Ross, former Washington distributor for Kelvinator and parent company of Montgomery Electric, died recently at his Washington home.

### Betty Carstairs Installs Crosleys in 'Hideaway'

NASSAU, N. P., BAHAMAS—Betty Carstairs, famous sportswoman, and outstanding woman speedboat driver is using Crosley electric refrigerators in the "hideaway" home she is building on her estate at Whale Cay, one of the Bahama islands located approximately 40 or 50 miles from Nassau. Miss Carstairs purchased her Shelves from Neill Bros.

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## Air-Conditioned Home of the News Elicits Approval of the Visiting Refrigeration Engineers



A.S.R.E. engineers found the air-conditioning features of the News' new addition of more-than-ordinary interest. (1) C. D. Haven, president of the Thermopane Co., explains window-glass insulation to his dinner-table companions. (2 and 3) Harry Williams of Frigidaire Corp., gets into an animated discussion with a companion over some of the unusual phases of the layout in the new addition. Apparently he made his point. (4) M. T. Zarotschneff, Russian inventor of the "Z" process of quick freezing, elaborates on it to a friend.



Even a host must eat . . . and how activity does stimulate the appetite! (1) Publisher-Host F. M. Cockrell and Mrs. Cockrell (2) listen to Mr. and Mrs. Frank Riley's comments on what a grand party it is. (3) Mrs. Cockrell samples the food, but Mr. Cockrell deserts his to tell a waiter that those folks over in the corner look like they wanted something. (4) Miss Muffy, Harry Edwards, Glenn Muffy (back to camera), and Mrs. Muffy.



Statistical Editor Jack Cutting, though busy with making guests feel at home, seemed to have difficulty keeping away from the costumed lovelies from the News office. Here he is seen having tete-a-tetes with (1) Mildred Miller and (2) Lucille McKay, News Senorita-stenographers. Wonder "Fiesta" take 'em home? (3) Guests from down the street—attractive Mary Smith, and the behemothian Phil Cobden, manager of Hotel Webster Hall. (4) A. D. McLay, prominent engineer of the Detroit Edison Co.



(1 and 2) Mrs. Cockrell, in conversation with Helen Peffer of A.S.R.E. headquarters, hears many nice things about the News' party. The bulge at right is the front elevation of Jack Adams, News production manager. (3) A. R. Stevenson of General Electric Co., and C. T. Baker, Atlanta (Ga.) consulting engineer. (4) Planning for the next day's sessions. Harry Harrison, Carrier Engineering Corp., A.S.R.E. president, and Prof. Hugh Keeler, University of Michigan, president of the Detroit section.



(1) The daguerrotyper at Greenfield Village, one of many quaint characters which engineers met Thursday on their trip to Henry Ford's settlement. (2) Dorothy Berlin, accordionist, pianist, songstress, and whooper-upper, kept dinner guests smiling with music and song. (3) Roy Sharp, News accountant, goes 'way up for a balloon. (4 and 5) Here's an idea of what our "Senoritas" looked like. Mildred Miller, secretary to Subscription Manager Jean Adams, poses in the costume worn by our girls at the Fiesta.



## COMMERCIAL REFRIGERATION

### McPherson Explains Problems In Cooling Display Windows

DETROIT—Methods of making refrigerated market windows operate successfully and economically were described in detail by Hal W. McPherson, engineer, the Kroger Grocery & Baking Co., before the Thursday morning technical session of the A.S.R.E., meeting here last week.

"The successful operation of a meat window in summer," said Mr. McPherson, "is impossible without the intelligent use of awnings, for it is impossible to preserve cut meat properly when subjected to the direct rays of the summer sun."

"On one sunny August day a radiation thermometer (Radif) lying on the display showed a black bulb temperature of 175° F. with an air temperature of 58° F. The surface of the meat was frying in a temperature of 58° F."

"The 'violet rays' of the sun will 'sunburn' or 'light strike' cut meats regardless of temperature, hence we must protect cut meat displays from sunlight. The surface of 'light struck' meat assumes a fishlike appearance."

"The effectiveness of awnings may be greatly increased by (1) 'metallizing' the under-surface (aluminum paint is fairly good for this purpose) or (2) allowing ventilation at the top of the awning. Both these measures have difficulties and are little used."

#### Venetian Blinds Have Use

Mr. McPherson pointed out that frequently it is impossible to shelter the window properly with awnings due to (1) the sun entering under the end of the awning, (2) prohibitive or limiting local ordinances, or (3) interference with foot traffic. Hence Venetian blinds instead of awnings are necessary, and if the window faces due north, due south, or is properly sheltered by other buildings, they may prove satisfactory.

"The real problem with awnings is to secure intelligent cooperation from a busy butcher," the speaker stated.

"This difficulty has suggested the use of electrically operated awnings or Venetian blinds controlled by means of a photoelectric cell."

#### Great Fluctuation in Heat Load

"Fluctuations of the heat load on a meat window from day to day, and even from hour to hour, can be readily appreciated as being enormous, when we consider that the same windows may conceivably require heating to prevent merchandise from freezing within a few hours after a considerable refrigeration load."

"Heating is usually accomplished by letting air from the store into the meat window enclosure. The remedy is not always that simple, and is always complicated by humidity troubles. A meat window is a non-insulated structure located half outdoors. The erratic quality of such a load means that you cannot multiplex meat windows with other fixtures on one compressor."

"During hot weather the heat losses through the plate glass are so enormous that gravity cooled meat windows can maintain refrigerated conditions to a height of only 3 or 4 in. above the display deck. Even during more moderate weather it is difficult to secure refrigeration to any considerable height."

#### How Heat Load Is Expressed

"Heat loads are most expressible not in terms of the area of the plate glass but in terms of front footage, for due to stratification in hot weather we have appreciable refrigeration to only a height of about 1 ft. and practically none at all above 3 ft. except in certain types of installations."

"The actual conducted heat losses at any particular level are, no doubt, different for every type and every specific window, but these losses seem to integrate out to about the same totals."

"The subdivision of the heat load (at 100° F. outdoors and 40° F. on the display deck) made on the assumption that the losses integrate to the equivalent of an effective height of 3 ft., are interesting. The fact that the temperature just within the glass 3 ft. above the display usually approaches 100° F. more than justifies this assumption."

"The heat loss in B.t.u./hr. due to conductivity alone per lineal foot of plate glass equals 200. Heat loss in B.t.u./hr. due to conductivity alone per lineal foot of 3 in. spaced double glass—100."

"Since the total heat load with present type awnings is measured to be 1,500 (facing west), it follows that 86% per cent of the total heat load is due to radiated and reradiated

heat with double glasses, and 93 1/2 per cent with single glasses."

"Even with gravity coils the circulation in hot weather is likely to be so rapid as to cause 'wind burn' or 'air scour,' due to the enormous heat transfers which occur in the limited space of a meat window."

"Over 80 ft./min. air movement in contact with the display is dangerous under any circumstances, is untenable at less than 100 per cent humidity. The relatively large quantities of heat which must be exchanged in 100° F. weather require a minimum average air speed of 45 ft./min., by test, at which average speed it is difficult to escape maximum speeds of over 80 ft./min."

"In 'bottom refrigerated' windows the circulation of the refrigerated lower portion of window induces a secondary circulation known as 'aspiration,' above the refrigerated portion. This circulation is too slight to be measured except in windows refrigerated by forced air."

#### Cold Air Spills Down

"In a fully refrigerated meat window the hanging displays are cooled chiefly by the cold air from the overhead coil spilling over them on its way down. Carcasses when hung in a window are always hung on the rear wall of the window for structural reasons. Fortunately this is the best place to hang displays from a viewpoint of refrigeration, as the cold air from the top coils spills directly over them here."

Due to the effects of radiation, irradiation, and 'air-scour,' it is necessary to keep the air in contact with the cut meat display at 100 per cent relative humidity at all parts, the speaker pointed out.

To accomplish this it is necessary to have over 100 per cent relative humidity at the entering point of the circulation. This requirement simply means that a humidifier is a necessary part of meat window equipment. Due to the short storage period, sliming does not become serious at 100 per cent relative humidity."

Mr. McPherson declared that inasmuch as the surface of the meat is frequently (even momentarily) at a relatively high temperature (with respect to the bulk of the meat), surface discoloration, sliming, and other deterioration may sometimes occur, often of such a negligible penetration that the meat can be apparently perfectly restored by simply washing or at most scraping the surface."

#### Sliming Can Be Serious

"In warm weather in a window incapable of maintaining satisfactory temperatures, this trouble becomes serious," averred the speaker.

"It is claimed that ozone will inhibit bacterial action and prevent discoloration of meat up to relatively high temperatures."

"In summer the front plate glasses of refrigerated windows tend to 'sweat' on the outside. In winter the plate glass tends to 'fog' on the inside."

"In other words, condensate forms on the warmer side of the glass in both seasons. Naturally a fogged or sweated glass obscures the display and defeats the purpose of the meat window, the display of meat for sales purposes."

"While summer sweat is entirely due to refrigeration, winter fog is in no way due to refrigeration. Meat windows usually fog much worse than the other display windows of the store, but this is entirely due to the fact that the meat window is enclosed while the other windows are not."

"Any enclosed window will fog badly in cold weather as compared to an unenclosed one, due to lack of circulation, and the attendant temperature difference. Even partial enclosure can cause a serious increase in the fogging of the plate glass store front."

#### To Prevent Fog and Sweat

Methods of preventing fog and sweat as outlined by Mr. McPherson include:

1. *Outdoor ventilation*—By this method the temperature inside the window is kept substantially the same as outdoor temperatures at all times, thereby eliminating all fogging and sweating. The objections to street dirt, unreliable temperatures, freezing of displays, etc., are the same as those experienced by the domestic users of 'window box' refrigerators.

2. *Indoor ventilation*—This method is adaptable only to certain types of refrigerated windows. The circulation

prevents fog in spite of temperature difference.

"This type of ventilation is the most successful but it is not adaptable to fully refrigerated windows of any type, since the ventilation cannot be prevented from entering the refrigerated portion of the window," declared Mr. McPherson. "The chief objection to this type of ventilation is that dehydration of the display will result."

3. *Double glasses*. The use of a double plate glass will eliminate both 'fog' and 'sweat.' Double glass will also reduce the average or annual heat load as much as 30 per cent. Its disadvantages are that (1) first cost is almost prohibitive; (2) the air space between the glasses must be sealed tightly and replaceable dehydrators must be installed between the glasses to prevent 'steam' from forming between the glasses; (3) diffraction, reflections, high lights, etc., render vision unsatisfactory. Double glasses are in fact very little used.

"In a 'fully refrigerated' window, double glasses are, however, the only solution to the problem of sweating; hence ordinary practice is to 'let her sweat.'"

"In bottom refrigerated windows the use of a low glass baffle will eliminate sweating without rising high enough to obstruct vision seriously. This enclosure partially duplicates the effect of using double glasses with a minimum obstruction of vision."

#### Advantages of Big System

The advantages of a "fully refrigerated" window as outlined by Mr. McPherson are:

1. That whole carcasses can be hung and displayed therein.
2. Better natural circulation is secured.
3. Better natural humidities are secured, due to the fact that while "cold" stratifies, humidity does not. Hence we secure higher natural

humidities by refrigerating the full height of the window. The humidities so naturally obtained are still not high enough for perfect preservation of meat, so this advantage is questionable.

#### Disadvantages

The disadvantages of this class are:

1. Few people buy a whole carcass, hence displaying one is of questionable value.

2. The ranging display shuts off the potential customers' view of the store and darkens the store. The store itself is really a vital part of the display.

3. This design involves expensive refrigerator construction all the way to the ceiling.

4. No two windows are ever alike, and extensive fitting is necessary in every installation.

5. Adequate depth for a proper top bunker design is infrequently available, and when available the window becomes too deep for satisfactory servicing.

6. In warm weather the heat extraction necessary to maintain refrigeration to the full height of a meat window is too great to be practical.

7. Operating cost is rather high. The operating cost of a meat window frequently equals that of the remainder of the refrigerating equipment in a store.

#### 'Bottom Refrigerated' Window

The "bottom refrigerated" window has these advantages:

1. Lower first cost. Insulated con-

#### "III"

1. High Temperatures.
2. Dehydration.
3. Radiant Heat and Irradiation.
4. Wind Burn.
5. Fogging Glasses.
6. Sweating Glasses.
7. Surface Bacteria.

struction above the glass baffles is unnecessary. In fact, leaving the window totally unenclosed above the glass baffles only increases the compressor's running time 30 per cent. This increase is due to an increase in the aspiration circulation losses.

2. Lower operating cost.
3. More consistent performance.
4. Can be standardized.
5. Is more adaptable to complete air conditioning.

6. More efficient, for inasmuch as the refrigeration chiefly stratifies in the bottom of the window or is lost through the plate glass on the way down from an overhead coil, it would seem profitless to try to refrigerate any part but the bottom of the window."

"The type of merchandise displayed in a meat window is essentially cut meat," Mr. McPherson pointed out.

"Meat should not be cut until it is ready to be sold, for under the best conditions it can be perfectly kept for only a few hours; hence meat window displays must be changed daily."

"All kinds of refrigerants and all types of refrigerating systems are used on meat windows. The size of the compressor needed for a meat window varies roughly with the length of the window; usually 1/2 ton per 7 lineal feet is used. The cooling determines the results secured therefrom."

#### 'Ills' and 'Cures'

Here is a summary of the ill a display window is subject to:

#### "Cure"

- Forced Draft Refrigeration.  
Humidifier.  
Awnings.  
Controlled and Baffled Air Flow.  
Ventilation.  
Double Glasses or Glass Baffles.  
Lower Temperatures or Ozone.

ALL  
**DELCO MOTORS**  
HAVE *Accurately*  
*Machined* PARTS



• Concentricity of the revolving and stationary parts of an electric motor is necessary if good performance is to result. To accomplish this essential requirement, all machining must be accurate. In Delco motors, required tolerances are assured by new and better methods of manufacturing developed by Delco engineers. In fact, Delco engineers have made significant improvements in almost every production operation—one important reason why Delco motors are so quiet and so reliable in performance.

**DELCO PRODUCTS CORPORATION**  
DAYTON, OHIO

*Made in Canada by the McKinnon Industries, Ltd., St. Catharines, Ont.*



**DELCO MOTORS**



## ELECTRIC REFRIGERATION NEWS

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## Air Conditioning Comes of Age

**S**IGNIFICANT to a great many engineers who attended the sessions of the American Society of Refrigerating Engineers last week in Detroit was the fact that speakers on the floor and questioners from the audience did not so nearly come to blows over the subject of air conditioning this time as they have at previous meetings. There was even considerable evidence to support the belief that the air-conditioning industry's leading engineers are at long last agreeing on fundamental principles.

At the A.S.R.E. sessions this year the chief arguments over phases of air conditioning were limited to such "fine" points as how much dirt an average human being will bring into his home during the course of a day, how much clean air per person per day is needed, the proper temperature for air at the time it is introduced into a room, and the relative sizes of ducts required to insure adequate air velocity. The *how* and the *what* of air-conditioning theory seemed to be rather definitely settled in the minds of the noted assemblage of engineers present at the convention.

Those who have attended previous A.S.R.E. conventions will recall that the very name, air conditioning, was sufficient to start an endless series of discussions, arguments, and uncompromising disagreements. Every phase of air conditioning was apparently a moot point, and generally there were as many different solutions to each air-conditioning problem as there were men present at the meetings. This year, however, it was a happily different story. Speakers on air-conditioning subjects—both on the formal program and off—were challenged occasionally, to be sure, but invariably the challenge concerned a minor point in the thesis rather than a major principle.

What this progress in engineering thinking along air-conditioning lines will mean to the salesman of air-conditioning equipment can scarcely be measured. It has long been the contention of many observers that one of the chief handicaps of the air-conditioning industry was the apparent fact that there had been so much dissension within its own ranks.

Air-conditioning engineers held widely divergent theories as to *how* the air in any given place should be controlled, as well as to *what* constituted air conditioning. These diverse views were communicated on down through the competing sales organizations. As a result, after a prospect for air conditioning had listened to three or four different salesmen, he was so utterly confused that he frequently could come to just one conclusion: air conditioning was not yet "ready." Hence, he postponed buying.

So widespread has this idea become that salesmen report that the commonest objection on the part of prospects is generally phrased somewhat like this: "Yes, air conditioning is going to be a great thing in the future, but I hear it isn't practical for small users yet."

It surely isn't presumptuous to say that probably the most important job facing the air-conditioning industry today is that of convincing people that *air conditioning is here*. Manufacturers have equipment on the market right now which will do specific jobs, and do them well. The larger organizations will figure on almost any installation you could want—from a theater with a load of thousands of human beings down to a cubicle in which one person sleeps.

The sooner the industry can get together on definite installation standards and practices—which will mean, for one thing, that quotations on the same job will at least compare with one another, instead of being so widely and confusingly apart as they frequently are—the better it will be for all concerned.

But in the meantime, it seems evident that the progress of the industry from a sales viewpoint should be considerably advanced if the various elements of the industry—manufacturers, dealers, and salesmen—could work concertedly to get the idea across to the American public that air conditioning is a definite service which is *now available*, and not something—like television—which may arrive sometime in the indefinite future.

Not only is such a promotional campaign indicated for the general public, but a big educational project seems in order for distributing outlets. One of the chief reasons for the wide gaps which exist in a good many air-conditioning distributing organizations is the fact that dozens of the best merchandising concerns in the whole country remain as yet unconvinced that air conditioning has sufficiently advanced to engage their attention and talents. Before investing their time and money in the promotion of any new line, they want to be sure that what they are getting into won't be more trouble than it's worth.

If the science of air conditioning has progressed to a point approaching reasonable exactitude, for practical purposes—and engineers at the A.S.R.E. spring meeting gave evidence that it has—it's time that the air-conditioning industry began an intensive and thoroughgoing campaign to get that idea across to prospective dealers and customers.

## WHAT OTHERS SAY

### Air Conditioning for Health

**F**OR years a considerable number of engineers have thought that air could be so conditioned that it would have value as a tool for use by the medical profession. Any statements to this effect by engineers, however, were usually regarded with scorn by anyone connected with research or practice of medicine. Since air conditioning has been popularized researchers in various branches of medicine have shown a really surprising interest in its possibilities. Numerous experimental rooms have been equipped and studies have been initiated. These have ranged all the way from those where conditions were kept at a point intended to promote convalescence, to those wherein conditions were deliberately varied greatly from those usually thought of in comfort work. Atmospheres have been enriched in oxygen, increased in pressure, and used with temperatures in the neighborhood of 175°. Recently it was reported that high temperatures appeared to have possibilities in treating lung diseases. Progress in the human health aspects can be expected to be slow, as it should be, for no one wants to see any false moves made which will give air a setback now that we seem on the way to its extended use in treating disease and promoting good health.—*Heating and Ventilating*, May, 1935.

### Industrial Legislation Is One Thing—Enforcement Is Another Thing

**A**RTHUR WHITESIDE, who retired last month from NRA to devote his time to his own business (Dun & Bradstreet) made a significant observation at a luncheon given in his honor last June. Mr. Whiteside at the time was General Johnson's left bower. This is what he said: "The NRA has passed into the enforcement stage and there are few who know anything about industrial self-government . . . they have nothing to fall back on in the way of experience or precedent."

Last month the man who was General Johnson's right bower in the difficult days a year ago, spoke at a luncheon given in his honor—Donald Randall Richberg. The man who in these experimental times is referred to as Assistant President of the United States, described the difficulties of the NRA enforcement era (since last June). Said he: "Twenty years would not be too long a time to devote to perfecting the Administration National Industrial Recovery Act."

Mr. Richberg speaks from knowledge, being one of the country's foremost authorities on transportation and interstate commerce. He cites as an illustration the Interstate Commerce Commission Law formulated back in 1890 which is still the subject of litigation in the courts of this country.—*House Furnishing Review*, May, 1935.

## LETTERS

### Best Wishes

Western Union Telegram  
Hot Springs, Va.  
May 22, 1935.

Editor:

My attendance at Nema convention prevents acceptance of your kind offer to be present tonight at your housewarming party in honor of members of A.S.R.E. in convention and to commemorate formal opening of your new building.

Please present my respects and kind regards to your guests and accept my heartiest congratulations on your continued success as publisher of *ELECTRIC REFRIGERATION NEWS*, which is again evidenced by acquisition of your new air-conditioned business home.

Your valued constructive assistance to electric refrigeration industry throughout your career and your helpful cooperation in solution of the many problems arising from time to time are highly appreciated.

Wishing you even greater success in the future.

FRANK S. MCNEAL, President,  
Universal Cooler Corp.

### 6-Year Guarantee?

Quattlebaum Electric Co.  
302 King St., Charleston, S. C.

Editor:

The Spartan refrigerator dealer here claims that the manufacturer of the Spartan refrigerator is now giving a six (6) year guarantee with this product.

We have been unable to find any reference to it in *ELECTRIC REFRIGERATION NEWS*, but we have mislaid a few copies and it may have been in one of them.

Will you kindly advise us if you have any information on this "6-year guarantee."

G. CARLTON HOSCH.

Answer: Says M. F. Bickford of the sales department, Sparks-Withington Co.—

"The information you received about a six-year guarantee on our electric refrigerators was not correct. We have made no change in the guarantee policy which is a one-year warranty to the original purchaser."

### Specifications June 12

968 Brown St., Akron, Ohio

Editor:

Please send me or let me know where I can get a comparison book on all makes of refrigerators for 1935.

JOHN KULYSKI.

Answer: Specifications of 1935 models of household electric refrigerators were published in the March 20 issue, but after filling 41,000 orders for this data, the supply was exhausted, so revised specifications of household refrigerators will again be published in the June 12 issue.

### How Do They Stand?

Crutchfield Motor Co.  
Orangeburg, S. C.

Editor:

Will you please advise us the relative standing of the 10 leading manufacturers of electric refrigerators, giving them in the order in which they stand, based on production and sales.

CRUTCHFIELD MOTOR CO.

Answer: Since the sales figures of individual manufacturers are not made public, we cannot furnish you with this information.

### Data Book Ready Soon

U. S. Department of Labor  
Bureau of Labor Statistics  
Washington, D. C.

Editor:

Have you made a revision of your REFRIGERATION DIRECTORY AND MARKET DATA BOOK subsequent to the 1934 revision? If you have not, when do you plan to publish the next revision?

I should very greatly appreciate your giving me this information, as I am making a study of refrigeration and, of course, desire to make use of the most recent sources of facts and figures.

C. C. LINNENBERG, JR.,

Div. of Economic Research.

Answer: The 1934 DIRECTORY has been revised and is being published this year in two volumes.

Volume I, the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY which is now available, contains names and addresses of all manufacturers of refrigeration and air-conditioning equipment and is the Buyers' Guide section.

Volume II, the 1935 REFRIGERATION AND AIR CONDITIONING MARKET DATA BOOK which will be ready in a few days, will contain statistical and market data information.

"Have enjoyed your paper for almost a year and have nothing but praise for all concerned."—Hedest Hardware Co., Inc., Tamaqua, Pa.

### Aggressive Service Firm

Refrigeration & Appliance Service, Inc.

15 S. 13th St., Terre Haute, Ind.

Editor:

We note in your May 15th issue under caption "List of service men" Question No. 2233 that an Illinois manufacturer wants a list of dependable service companies to service ice cream freezers.

We wish to list ourselves with you as an independent service organization with an adequate number of experienced factory trained men.

Our service area extends within a 50 mile radius of Terre Haute, we give both night and day service and have the necessary finances. Will give references.

We service all makes and types of commercial and domestic refrigeration and install. We have had freezer experience. At the present time we are handling the installation and service of all Russ soda fountain and counter freezer equipment in this area.

A. G. BELDEN, JR.,  
Manager.

### From Bad to Worse?

J. A. Bowen  
Greenville, Miss.

Editor:

Please note the low plane to which the sale of electric refrigerators has reached in the following classified advertisement:

"WANTED—Let's trade. We will take cows, mules, horses, hogs, or anything else in trade on Furniture and Electric Refrigerators. Tatum Furniture Co., 213 Main St., Phone 911."

However, this is quite elevated compared with the meter plan that is being used here recently. A person does not have to have anything at all to get a refrigerator on this plan, not even a job or a reputation to pay.

J. A. BOWEN.

### Not a Chain Letter

Monnig's  
General Electric Dept.  
Fort Worth, Tex.

Editor:

This is NOT a chain letter. For the enclosed dime I'd like for you to furnish me with a copy of *ELECTRIC REFRIGERATION NEWS* containing the specifications for household models of electric refrigerators. The date, I believe is March 20, 1935.

Although not a subscriber, I read your publication regularly, and appreciate your unbiased and fearless treatment of questions in the industry. May *ELECTRIC REFRIGERATION NEWS* grow bigger and better with the industry it serves.

CARL L. ACUFF.

### A Chance for Some Selling

Walhalla, N. D.

Editor:

I would like to get some information regarding electric refrigerators. Could I obtain this information through your magazine or direct.

I would like to get the best up-to-date machine on the market that would give the longest and best of service at the lowest cost.

This is for my home.

I do not know much about refrigerators and as there are so many on the market I find it impossible to decide which would be the best buy. Any information you can give me will be confidential.

MRS. ALBERT HORNING.

### Service Data on Orphans

128 Brunell St.  
Wauseon, Ohio

Editor:

Enclosed please find check \$3, for which enter my subscription to *ELECTRIC REFRIGERATION NEWS* for one year. I am an independent service man and from the sample copies your articles on orphan machines have given me quite a lot of information.

ED RUEGER.

### A Cheer for Mr. Newcum

The Starr Co.

664 Washington St., Brighton, Mass.

Editor:

Attached is check to continue my subscription to the *News*, a year from its expiration, the last of the coming month.

Mr. Newcum's masterly service contributions should meet unanimous appreciation among those in all departments of refrigeration. I was about to inquire whether the series would be compiled in book form, when your probable affirmative response was made to another inquirer.

A. L. JEWETT.

"We have your recent letter calling our attention to expiration of subscription on the *ELECTRIC REFRIGERATION NEWS*. We have mailed the subscription form, together with check and want you to know that we appreciate your advising us as we always look forward to receiving each new issue of the *ELECTRIC REFRIGERATION NEWS*."—J. N. Varnell, W. C. Dance, Inc., Oklahoma City, Okla.



## Henderson Urges RMA to Limit Activities to Fewer Problems

(Concluded from Page 1, Column 3)

tute, the Textile Institute, and other similar trade groups over the past years as evidence that highly individualistic businesses can be completely cooperative, and succeed.

"My own feeling is that if this association is to accomplish the underlying purposes for which it was formed, and be a business association in the true sense of the term, a greater spirit of wholehearted cooperation must be evidenced," Mr. Henderson said.

### Attempt Too Many Things

One of the difficulties lying in the path of concrete accomplishment, he asserted, has been the fact that too many things were being attempted at the same time, resulting in a multitude of committees. Some individuals, he added, were on as many as six committees at a time—placing an unwarranted burden on the shoulders of a few.

His suggestion was that the association confine its activities to few things, and do them well, rather than attempt many things, and do none of them well.

"In hunting these bogies," he said, "it is better to use a rifle than a scatter shotgun."

### Four Committees Proposed

Three committees, in addition to the executive committee, he recommended as worthy of the association's concentrated effort: standardization of equipment, standardization of terms of sales and payment, and fair trade practices.

Other general problems, such as combating proposed adverse legislation, patents, and the like, he said, may be placed in the hands of the executive committee, which can then instruct the association staff regarding the course of procedure to be followed.

### Fight Ice Industry Code

"During the past six months, one of our particular activities has been the combating of Article XI of the ice industry code.

"The ice industry was in an advantageous position, politically, with the National Recovery Administration. It was strongly represented in Washington, so that headway could not easily be made by our industry to protect its interests. The executive committee felt that in this instance fire should be fought with fire.

"A mass of evidence proving monopoly and maladministration of Article XI was assembled and placed in the proper quarters in Washington. Constant pressure was brought to bear upon various divisions of NRA, with the result that in the first five months of this year the production tonnage approved by NRA for installation was 10 times that approved in the entire year of 1934.

"General counsel cooperated with and advised attorneys who were combating Article XI in the courts for

their clients, with the result that there are many lower court decisions holding that Article XI of the ice industry code is unconstitutional. The Federal Trade Commission, in ruling on the Purity Ice Co. case held that the NRA could not interfere with the operation of this plant, as the plant was engaged solely in interstate commerce.

"Various senators and members of the House have also interested themselves in the fight against Article XI and undoubtedly further pointed references to this piece of codification will be made on the floor when the extension of the NIRA is being debated.

### Production Control Opposed

"You will note that every suggestion for the extension of NIRA has contained the statement that such extension shall not include price fixing and control of production provisions, except for natural resource industries. For this your association may claim some slight measure of credit.

"NRA has not 'stayed' Article XI of the ice industry code, but is permitting it to expire with the NIRA on June 16. This action of NRA was dictated by political expediency.

"We are fully confident that in another two weeks' time Article XI will not be in even technical effect. It has been rendered practically ineffective for the last several months.

### RMA and Nema Cooperation

"One of the accomplishments which it is a pleasure to report is the fine spirit of cooperation that has grown between RMA and Nema. Representatives of the two groups are meeting on the most friendly and sensibly cooperative basis, which augurs well for highly beneficial results in the future. If nothing else had been gained in the past six months, this one thing would justify your association's existence."

Reporting on the workings of the RMA sections in Chicago, New York City, and Philadelphia, Mr. Henderson said:

### Chicago Section Active

"The Chicago section, a hard-hitting and aggressive group, has had to face labor problems growing out of the operations of the Heating, Piping & Air Conditioning Contractors' industry code, owing to an obvious, though unprovable, collusive agreement between the Master Steamfitters' Association and the Steamfitters' Union.

"Standardization of business practices have been formulated by the Chicago section, and closely adhered to by its members.

"The New York City section also has a record of achievement since last fall, and particularly outstanding is the work it has done with the New York City fire code.

"The code, as originally drafted, placed unreasonable and unbearable restrictions on refrigeration and air-conditioning installations; but, after conferences with the authorities, the

New York City fire code, as now written, is a much more workable document so far as refrigeration and air conditioning are concerned."

There followed a discussion of fair trade practices, led by Stuart E. Lauer of York Ice Machinery Corp.

### Installation Problems

Most of the discussion centered about installation problems in Chicago, St. Louis, Cincinnati, Kansas City, and New Orleans, where difficulties with steamfitters' organizations are being encountered. A committee was appointed to consider this problem, and report on it later.

John W. O'Leary, president of the Machinery & Allied Products Institute, was a speaker at Friday's luncheon meeting. His talk dealt largely with MAPI's attitude toward legislation now before Congress, and the New Deal generally.

"Recovery, if it is to come, must come through the durable goods industries," Mr. O'Leary said. Ever since its inception, he said, MAPI has fought two New Deal policies: Recovery through scarcity, and restriction of production; greater flexibility for hours of wages under codes, and a general wage scale which would permit manufacturers to make a fair profit.

With these thoughts in mind, he said, a program of public education was begun, with the result that today there is a knowledge and concept of governmental activity never before known in our history.

Of the future, Mr. O'Leary said: "Trade associations must continue their work despite all obstacles put in their path by NRA; they must continue to bring together men with common purposes and problems. Not to keep on would be shortsighted.

"We have gained the respect of the public and of government departments."

Emphasizing the power of an organized minority, the speaker said

that trade associations must participate more actively in politics, and make their power felt more in government circles.

The American Federation of Labor, he said, swings a big club in Washington because of the votes which it claims it can deliver.

### Proposed Platform

The future will see more and more interference by government agencies in the field of private business, he predicted. He asked for an organization of employers and employees on the following simple platform:

No government interference or regulation of private enterprise.

A reduction of governmental operating expense.

A balanced budget.

D. Norris Benedict was named representative, and W. S. Shipley, alternate, of RMA to the Machinery & Allied Products Institute.

In the equipment standardization forum, led by A. H. Baer, it was emphasized that more complete data on specifications of machines should be made available. Prices of similar equipment, it was pointed out, are more uniform now than in several years.

Standardization of speeds for a given stroke, data, and the like, so as to make possible a uniform price, was mentioned as a desirable goal. In this respect, the activities of Nema along these lines was praised, the RMA members urged to follow suit.

Suggestions included the rating of small motors on a B.T.U. instead of the usual horsepower basis, and the standardizing of tests on all units of similar class. Members held considerable discussion as to the advisability, from an operating standpoint, of limiting their lines to a reasonable number of units of sufficient size and flexibility to handle all types of needs.

In this way, off-size units would be eliminated, and the factory and dealers enabled to keep a stock of replace-

ment parts within easy reach, for servicing purposes.

Emil Vilter of the Vilter Mfg. Co. leading a discussion of employee relations, brought out the fact that skilled labor, since the depression, is scarce, and that a crisis in this field is impending unless apprentice training is begun again.

### Urges Apprentice Training

Apprentice training, Mr. Vilter pointed out, was largely neglected during the depression. If a sudden need should arise for skilled labor, he held, it would be difficult to find, since many of the former laborers in the field have gone into other lines of work. Common labor, as usual, is plentiful.

In the discussion which followed, some of the manufacturers reported that they were having difficulty in obtaining skilled workers for short periods, since these men, many of them on government relief projects, did not wish to leave their posts for a few weeks, even though the salary were higher, and run the risk of delay of getting back onto the government work after the temporary jobs were finished.

Present members of the RMA are: American Engineering Co., Automatic Refrigerating Co., Baker Ice Machine Co., Inc., Carbondale Machine Corp., Carrier Engineering Corp., Creamery Package Mfg. Co., De La Vergne Engine Co., Frick Co., Inc., General Refrigeration Corp., Linde Canadian Refrigeration Co., Ltd., Pennsylvania Engineering Co.

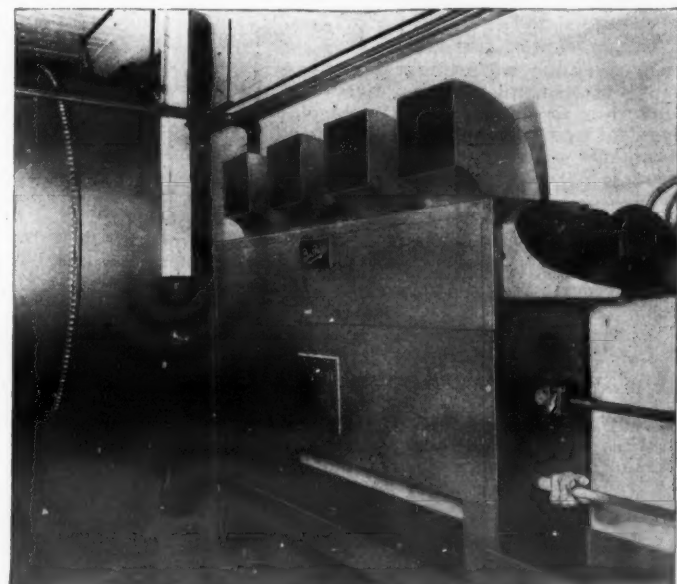
Phoenix Ice Machine Co., Pittsburgh Pipe Coil & Bending Co., Reliance Refrigerating Machine Co., Rempe Co., Roessing Mfg. Co., The Vilter Mfg. Co., Henry Vogt Machine Co., Voss Ice Machine Works, and York Ice Machinery Corp.

RMA sections are located in Chicago, New York City, and Philadelphia.

# Controlled Cooling with "Buffalo" Units

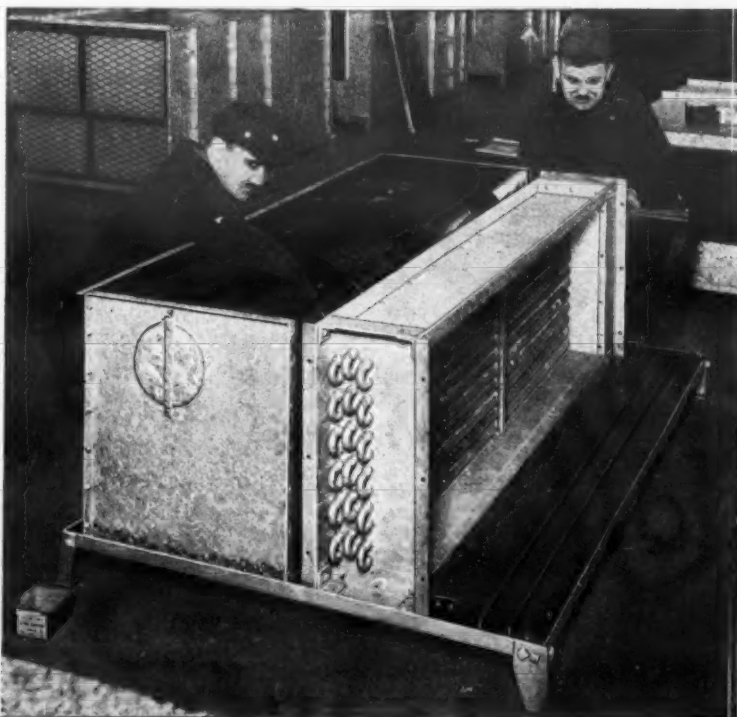
The air conditioning and cooling contractor who sells the "Buffalo" Line has distinct advantages.

- (1) We do no installing—thus do not compete with our contractors.
- (2) Our line is complete—tested in the laboratory and the field—and satisfactory in every respect.
- (3) Because buyers are demanding guaranteed results, the conservative rating of Buffalo Units is desirable.
- (4) Additional Buffalo Ventilating Fans can frequently be sold in connection with cooling and conditioning equipment.



Floor Type Unit Cooler Installed in Brewery

## Complete line of Units for ALL Refrigerants



Assembling a "PC" Cabinet

One of the most important factors in securing cooling and conditioning jobs is the ability to supply just the right type of unit for the job.

Buffalo Unit Coolers are available in suspended and floor types, also in flat suspended types, each with a variety of coils for various refrigerants.

For Comfort Cooling and complete conditioning, the "PC" Cabinet is an excellent unit, now providing highly satisfactory results wherever installed.

Full information on all this equipment will be sent on request.

WRITE FOR BULLETIN 2968

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487 Broadway Buffalo, N.Y.

In Canada: Canadian Blower & Forge Co., Ltd.  
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# CURTIS

## COMMERCIAL REFRIGERATION and AIR CONDITIONING UNITS

1/6 to 15 H. P.—Air and Water Cooled

The completeness of the Curtis line puts Curtis distributors in an enviable position especially in view of the extraordinary popularity of Air Conditioning.

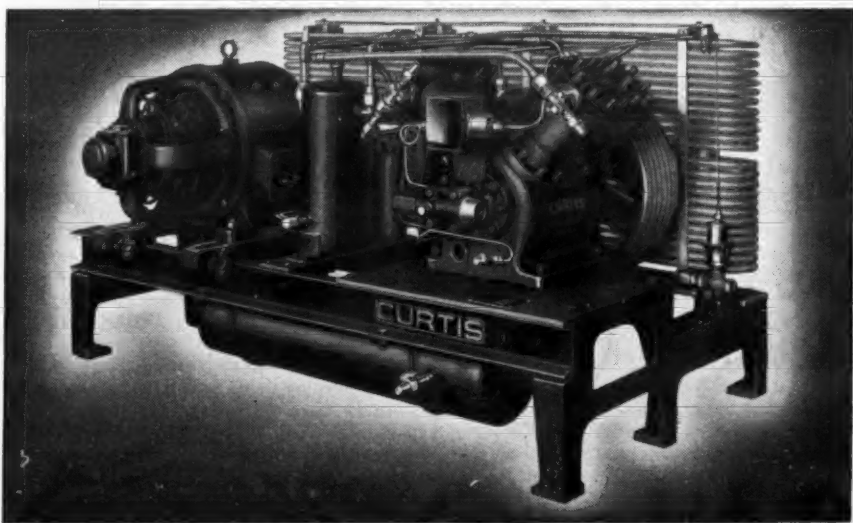
Some desirable territories are still open for reliable distributors.

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SUCCESSFUL  
YEARS  
ESTABLISHED  
1854

Proven Design  
Financial  
Stability

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## PERSONALITIES

By George F. Taubeneck

### The News Gives a Party

If you have written this department quite recently and are still waiting vainly for a reply, please listen to this alibi: We threw a party here in the new air-conditioned home of ELECTRIC REFRIGERATION NEWS last Wednesday night, and we're still recuperating.

The party was for the American Society of Refrigerating Engineers, in convention assembled here in Detroit at that time, and for a host of friends in and around Detroit.

Efforts to get ready for the party almost became frantic just before the deadline; and these labors combined with the job of attempting to keep pace with the remainder of the activities laid out for the A.S.R.E. men last week—and report everything in detail—have laid the staff of the NEWS pretty low.

Now that it's all over there isn't much we can say about the party, except that if you couldn't come we're very sorry, indeed; for we had a lot of fun ourselves, and we think that you might have enjoyed it, too.

There was plenty of food and beer for everybody—the beer being cooled by a Temprite-Universal Cooler installation supervised by GORDON MUIR—there was dancing, there was a show, and there was an excellent spirit of conviviality and friendly communion during the entire evening.

CORINE MUEER, official entertainer to the refrigeration industry, outdid herself in supplying the show, which was built out of such nationally known entertainers as CHAZ CHASE, EVELYN HOFFMAN, DOROTHY BERLIN, and GIOVINNI RIOTORO, in addition to Miss Mueer's regular line of girls, a dance team, a roller-skating act, and Corine's own superlative singing, which drew the most insistent applause and encore demands of the evening.

### After the Sessions

As it has done in the past, ELECTRIC REFRIGERATION NEWS reports in this single issue the entire proceeds of the technical sessions conducted by the A.S.R.E. All the papers presented at the three sessions are herein reported in minute detail.

It shall be the purpose of this page, then, to make an attempt to record some of the things the engineers did when they weren't listening to elucidations of psychrometric charts and arguments over extended cooling surfaces.

On the various get-togethers in hotel rooms and night clubs we won't attempt to dilate. We got around to a lot of them ourselves; but most of the information which popped out during those hall-fellow times needs to incubate a bit further before it can be hatched out into news.

The formal entertainment, however, constitutes a story which we'd like to set down for the benefit of all the A.S.R.E. members and their wives who attended, and who religiously made the rounds outlined by the entertainment and program committees.

First of all, there was our party, mentioned above. Then there was another party the next night out at Dearborn Inn, at which a show was staged by Kelvinator employees.

A number of attractive Kelvinator stenographers had been trained and coached by a Chrysler secretary (who used to be in show business) until they presented a very creditable dancing "line." There were "single" dancers and singers in the group, and all in all they put on a really good series of acts.

Trips to the Chrysler, Kelvinator, and Ford plants, and to HENRY FORD's Greenfield Village, along with a golf tournament out at GEORGE BRIGHT's club, constituted the remainder of the formal entertainment.

About the Ford plant we mean to talk next week. We're really ashamed to say that, although we've lived here for more than five years, it was the first time we had ever visited the Rouge factories or that amazing reconstruction of early American history known as Greenfield Village.

In just a moment we'll try to record our impressions of the trip through Greenfield Village (two big busloads of A.S.R.E. guests made the trip, convoyed by the Auburn speedster).

### The Mountain (History) Comes to Mahomet (Ford)

About 20 minutes drive from Detroit, the twin cities of Dearborn stretch quiet, protective (and protected!), peaceful, harboring on their outskirts the quaintness, dignity, and charm of early America—reconstructed plank-by-plank and brick-by-brick. Here is set aside a 200 acre plot for

an educational project reflecting the ideas of its founder, HENRY FORD.

These ideas, which have to do with the recrystallization of early American history, have been embodied in Edison Institute and Museum (an exhibit of relics of American industrial progress) and Greenfield Village, which is an antique American small town "in operation" just as such villages were "operated" many decades ago.

Fronting the museum building is a group of buildings which are architectural replicas of Independence Hall, Congress Hall, and the old City Hall of Philadelphia.

Supplementing this group is the village, where the handicraft arts of the past are carried on just as they were practiced in their original settings. Public buildings and residences are faithful replicas of the structures in which our much-remembered forefathers once foregathered.

Visitors enter Edison Institute Museum through Mr. Ford's reproduction of Independence Hall. Inside the museum walls are two courts, in one of which is the Pump House, a replica of the Rittenhouse Observatory which once stood in Independence Square, Philadelphia.

Even before going inside, visitors are impressed with the architectural details—and general sweep—of the institute. It is a simple, dignified, charming setting for the exhibits. Lofty arched windows, a large winding staircase, and a strikingly beautiful crystal chandelier make the Colonial lobby, directly inside the entrance, something to behold and ponder in hushed silence.

Glass cases in the corridor walls contain displays of flasks and bottles, unusual chinaware, American chinaware, American porcelain. Period furniture, placed in what must be just the stuffy proper spots, invites the attention of guests who can't stay home when there's an auction sale of antiques.

Hedged in by a white picket fence, a rectangular yard is the setting for buildings reconstructed from (or replicas of) those used by Mr. Edison at Menlo Park, N. J., while he was established there between 1876 and 1886.

The soil surrounding the Menlo Park group differs from that in the rest of the village because it is the actual reddish soil characteristic of Menlo Park, N. J., from where it was transported.

Visitors notice particularly the lampposts with helmetlike domes which are in the yard. They are reproductions of the originals at Menlo Park, first introduced by Mr. Edison after the invention of the electric lamp. Street lamps previous to that time had been lozenge-shaped.

Included in the Menlo group is the Little Glass House, which was originally a photographic studio, and then became the shop where the first successful electric lamp bulb was blown. The attic has been restored to appear as it did when it housed the glass blower whose personal effects (including a zither) are contained therein.

To complete the authenticity of the setting, a pit where broken glass was thrown has been reproduced in the yard. Near it is a case containing relics recovered from the original discard pit.

Just to give you an idea of how thoroughly Mr. Ford went about his self-appointed task of restoring Menlo Park, consider the combined office and library which occupies the corner of Woodbridge and Christie St. It should be noted that the building had been entirely dismantled when Mr. Ford arrived on the scene. In restoring it, the brick used was obtained from the brickyard which supplied Mr. Edison when he built the original structure.

Each shutter in the house contains part of the only original shutter which could be found.

The laboratory where the first phonograph was produced, the first practical incandescent lamp, and other Edison inventions—including the microphone and telephone transmitter, is included in the Menlo Park group.

It appears just as it did when Mr. Edison used it. Original instruments and apparatus, and models of many of his inventions, are exhibited here. FRANCIS JEHL, who assisted Mr. Edison in the invention of the electric light, is in charge of the laboratory.

Behind the laboratory stand the carpenter shed and pattern shop where many of Edison's woodworking models and patterns were made.

Included in the Edison collection is the first electric locomotive, which was made by Edison in 1880. It was operated on a short track near Menlo Park.

The machine shop, which was the first central station for incandescent

## They Delighted the Engineers



Henry Ford's Greenfield Village, visited by A.S.R.E. delegates Thursday. (1) Stagecoach, colonial style, 1935 model driver. (2) Old Daguerrotyper.

lighting in the world, houses Edison's dynamos, the original boiler from Schenectady, where the great electrical wizard spent much of his time. Burbank's office was brought to the historical village from his experimental farm in Santa Rosa, Calif.

The cornerstone of the institute attracts especial interest because it bears the name and footprints of Edison, and contains a spade used by LUTHER BURBANK. Mr. Edison dedicated the institute on Sept. 27, 1928.

Main exhibition hall in the institute is said to be one of the largest of its kind in the world. It covers approximately eight acres. The teakwood flooring comprises the largest single expanse of teakwood floor in the world.

Of especial interest to engineers is the museum display of steam engines, which enables the onlooker to witness the orderly historical development of steam power—just as you can go to a paleontological museum and see the evolution of the horse, as shown in reconstructions of equine skeletons.

In this group the earliest engine dates back to 1755. It is of THOMAS NEWCOMEN design. This atmospheric pumping engine is the earliest known form of steam-operated reciprocating engine. It was originally used in an English mine, to lift water from a depth of 240 feet to the surface.

Included in this display is a Watt engine, said to be the only remaining Watt engine in which the design has not been altered or modernized. It was built for the Warwick & Birmingham Canal Navigation Co. and set up in 1796.

Though still incomplete, the electrical exhibit has several famous collections and displays. Among them is a model of the original New York Pearl Street Central Station, first of its kind in the world.

There is also the collection of 1,000 incandescent lamps, assembled by W. J. HAMMER.

Another corner of the electrical exhibit has a display showing a section of every cable stretched across the Atlantic, starting with the first, laid by CYRUS FIELD in 1858.

In the transportation group visitors find a reproduction of the "Rocket"—the first successful steam locomotive. It was made by the builders of the original Rocket, which was constructed in England in 1829.

The historical village borders around a village green, in authentic colonial fashion. Circling the green are the public buildings, the church, the school, the inn, store, courthouse, and the town hall.

Visitors are taken first to Clinton Inn. Built in 1831-32, this hostelry once stood in Clinton, Mich., and was an overnight stop for stagecoaches running between Detroit and Chicago. The furnishings of the inn are patterned after those used in the early nineteenth century.

The Chapel of Martha-Mary, overlooking the green, is a typical colonial church. It is a nonsectarian church which serves village residents, and pupils of the school and institute, as a retreat and religious center.

This chapel has been named after the mothers of Mr. and Mrs. Henry Ford, which, by a remarkable coincidence, were the same as the names of the sisters who ministered unto Christ, as recorded in the Gospels. Bricks and the front doors used in its construction were taken from the girlhood home of Mrs. Ford.

The spire of the church is a replica of one in Bradford, Mass. The bell in the steeple was cast by a son of PAUL REVERE.

Near the church an old stone mill, patterned after similar structures common 75 or more years ago, houses the heating plant of the chapel.

Suggestive of MARK TWAIN tales, the *Suwanee*, a stern-paddle-wheel

Mississippi river boat which churned through the churlish current of the storied Father of Waters half a century ago, is next stop on the tour.

First used on the Suwanee and Mississippi rivers, this boat was later enlarged and removed to Fort Myers, Fla. Here it carried passengers, freight, and mail on the Caloosahatchee river. The engines originally used in the boat were recovered by Mr. Ford, and reinstalled.

Next unit in the group is the Scotch Settlement School, where Henry Ford first studied Readin', 'Ritin', and 'Rithmetic as a bare-legged boy. The building was erected in 1861 in the old Scotch Settlement.

When the building was re-erected on its present site, in an informal dedicatory ceremony Mr. Ford and his schoolday seat mate again sat in their old corner just as they had done when they were boys, and inscribed their initials on the desk.

Three buildings comprise the McGuffey group, the central unit of which is the original birthplace of WILLIAM H. MCGUFFEY, author of the McGuffey readers—which are still standard in Mr. Ford's Greenfield Village schools. This log cabin was brought piece-by-piece from Washington County, Pennsylvania, where Mr. McGuffey was born in 1800.

Today boys and girls are taught their lessons in that self-same schoolhouse. Visitors are cautioned, as they pass by, to keep quiet so as not to disturb the students.

Adjacent to the log cabin is the old smokehouse from the McGuffey homestead. Third building in the group is a log cabin house, which was built from the components of several log cabins brought from the McGuffey neighborhood. This building is to be used as a school for the lower grades in the Greenfield Village schools.

A small, unimpressive two-story frame structure of black walnut, next is pointed out for visitors to the village, not for what it is, but for what it was—the house in which ABRAHAM LINCOLN practiced law for eight years.

This building was erected in 1840. Its lower floor was used for court sessions. A judge's bench is at one end of the long room, and a fireplace interrupts the rough walled space at the opposite end.

Feature of the court house is a corner cupboard, which was fashioned by Abraham Lincoln and his father.

Directly opposite the chapel, on the east end of the common, stands an eye-satisfying white building, copied from one of the early American town halls. The interior was made realistically colonial by the erection of a rostrum stage at the west end, and an old style stove in front, with stovepipes crossing the stage.

Staid and homely, but adding a thoroughly essential and familiar touch to any truly complete picture of early American life, is the Waterford Country Store.

This 81-years-old, white frame structure served as the general store in Waterford, Mich., until it was removed to its present location. Here you can buy anything from MAE WEST stockings and mustache cups to cut-plug chewing tobacco and coal-oil lamps. Goods are strung upon wires, stocked on shelves, and displayed in glass showcases in their original packages.

Three rustic-looking buildings which next claim attention, are the Gardner Home, exemplifying the pioneer home of a century ago; a long, gambrel-roofed livery stable, and a typical log house of Michigan pioneering days.

Deserving of special attention is the Greenfield Post Office. This small building was brought from Phoenix, Conn., where it was built in 1803. The post office received its present name, Greenfield Post Office, after Greenfield Township, birthplace of Mrs. Henry Ford. Post cards mailed from here bear the Greenfield Village postmark.

It has an old-fashioned pharmacy at one end of the building, where one may see yellowed old prescriptions strung up on a wire, antiquated apothecary's apparatus, hand-wrought nails, shutters, and lathes. Also to be seen are patent medicines which were imbibed by our ailing great-grandfathers.

You'd love the labels and the printed legends on the packages of these panaceas. Modern advertising messages seem to show excessive modesty and admirable restraint after you've read some of these howlers. Take the inscription on Farmer's Union Cattle Powder, which we copied verbatim:

"I have spent over 30 years in increasing the benefit of barn yard animals, and am highly elated to have laid a lasting prosperity to stock owners, as acknowledged by thousands, who use my powders and follow the advice given in my Dairy, Poultry and Doctor Book.

"Raise no more wheat, but make your money out of the barn and poultry yard." C. G. HERNER, Allentown, Pa.

Another sample of the advertising modesty of the period: "Dr. J. H. McLean's Strengthening Cordial, The Best Blood Purifier in the World."



## ENGINEERING

### Wile Gives Practical Methods of Measuring Valve Capacities

DETROIT—Practical methods for measuring the capacity of expansion valves were outlined by D. D. Wile of Detroit Lubricator Co. in a paper presented at the closing technical session of the A.S.R.E. spring meeting held here last week.

"During recent years the use of automatically controlled refrigerating systems has increased greatly, both in regard to number of units and the size of individual units, Mr. Wile said.

"The increased size of these systems has resulted in increased demands on the capacity of expansion valves, and since the valve forms such an important part of the system it has become necessary to establish an accurate and reliable method of rating its capacity.

"It is interesting to note that the entire literature of The American Society of Refrigerating Engineers contains only one reference to expansion valve capacity.

"There has been published many excellent papers which show methods of measuring the capacity of com-

pressors and evaporators but we have found not a single reference to any tests on expansion valves which took into consideration the practical limitations of the valve design."

#### Expansion Valve Seat

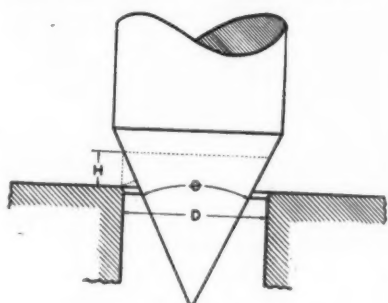


FIG. 1

"The capacity of an expansion valve Mr. Wile explained, depends largely upon the head pressure and suction pressure and the amount that the needle can be moved out of the seat, the actual diameter of the seat being of secondary importance.

This condition is shown in Fig. 1, where it will be noted that the needle occupies much of the orifice area and the flow of refrigerant is less than would be obtained through the free orifice.

Fig. 2 shows a cross section through a thermostatic expansion valve of the type that is largely used on present day commercial systems.

"In this valve the movement of the needle is controlled by pressure in the low-side or evaporator. The power element is charged with a thermostatic liquid and its bellows responds to the pressure produced in accordance with

#### Cross Section of Valve

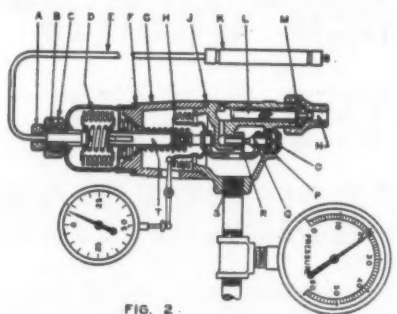


FIG. 2

#### Setup for Valve Testing

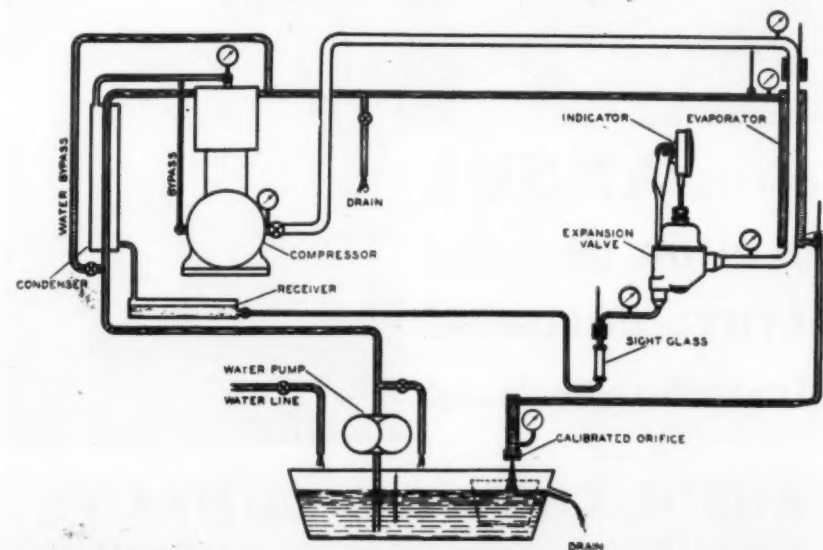


FIG. 4

the temperature of the sensitive bulb. "These two bellows oppose each other through a rigid push rod with the result that needle movement is determined by the relation between the pressure in the evaporator and temperature at the sensitive bulb.

"In practice when the bulb is clamped to the suction line at the outlet of the evaporator the needle moves in accordance with the superheat of the gas leaving the evaporator.

"An increase in superheat is required to open the needle and this is the factor that determines the practical limit of valve capacity, since too great an increase in the superheat causes starving of the cooling unit and inefficient operation.

"It should also be understood that this valve must close when the compressor stops, and closing of the needle requires a reduction of the superheat. It is therefore important to limit the needle movement within the range where the needle can be depended upon to close tightly."

Experience has shown that most evaporators work efficiently with the superheat on the suction line controlled at approximately 10 to 12 degrees, Mr. Wile said.

"Experience has further demonstrated that the maximum rating of the valve should require an increase in the superheat of not exceeding 6 or 7 degrees," the speaker added.

"When operated in this range the valve can be depended upon to close tightly during the shutdown period and to maintain maximum efficiency during the operating cycle.

"To open the needle it is necessary to overcome the resistance or so-called modulus of the bellows and springs in the valve. A simple method of measuring the amount of needle opening is shown in Fig. 2. The sensitive bulb is maintained at a constant temperature while various pressures are applied to the valve body. The dial indicator shows the needle movement at the various pressures, and these can easily be converted into superheat readings.

"Fig. 3 shows how the capacity of the valve increases with needle movement and it should be noted that the amount of opening used for the maximum capacity rating is not nearly as great as would be realized with the valve forced wide open.

"The maximum opening used for the capacity ratings was limited to twenty thousandths of an inch, this being the amount obtained with approximately 6 degrees increase in the superheat setting. Having determined the amount of opening, the capacity tests were conducted with the needle fixed in this position by mechanical means.

"The test set up, for capacity measurements, is shown in Fig. 4. The power element was removed from the expansion valve to provide for a mechanical adjustment to hold the needle open and the dial indicator showed the amount of opening.

"In this setup the condenser cooling water, after leaving the compressor jacket, was circulated through the evaporator. The refrigerating capacity

Figure 3

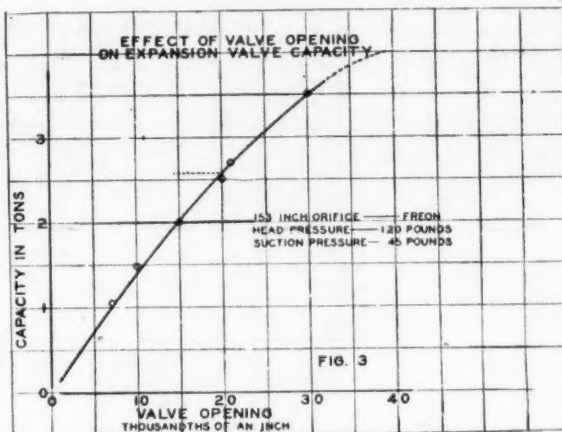


FIG. 3

Figure 6

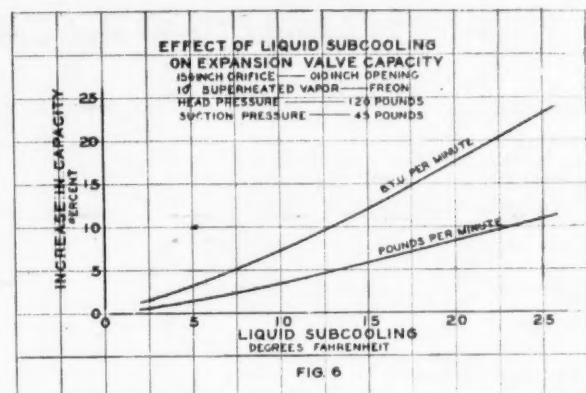


FIG. 6

was determined by measuring the quantity of water circulated and the temperature before and after passing through the evaporator. Thermometers inserted through stuffing boxes were used to obtain accurate water temperatures.

"The quantity of water circulated per minute was determined by weight readings taken during each test run. A calibrated orifice in the water line was also used as an indication of the regularity of flow.

"Readings were also taken on the pressure drop of the water through the evaporator in order to indicate the presence of ice formation. No trouble was experienced from this cause, however, even at low refrigerant temperatures.

"Subcooling of the liquid entering the expansion valve has an important effect on capacity, so a thermometer was placed in contact with the liquid line to indicate the liquid temperature. During some of the runs a separate cooling system was used to control this temperature. Other temperatures and pressures were measured in

accordance with the usual practice.

"Compressor capacity was regulated to some extent by changing motor pulleys in order to vary the speed, but a more satisfactory method proved to be the by-pass connection between the compressor discharge and the crank case.

"These tests required that the capacity of the compressor be varied over a wide range. Furthermore, it was important to keep the speed within reasonable limits to avoid throwing too much or too little oil.

"A summary sheet of one of the test runs is shown in Fig. 5. Note that the temperature of the liquid entering the valve was corrected to a condition of 10 degrees subcooling while the superheat of the gas leaving the evaporator was corrected to 10 degrees superheat, these conditions having been arbitrarily adopted as standard for all the runs.

"The variation in valve capacity caused by the temperature of the liquid is shown in Fig. 6, where it will be noticed that a decrease in the temperature of the liquid causes an in-

crease in the quantity of liquid passing through the valve and also an increase in the amount of refrigeration obtained from each pound of liquid. These two effects result in a substantial increase in the capacity. The temperature of liquid entering the valve is therefore an important factor.

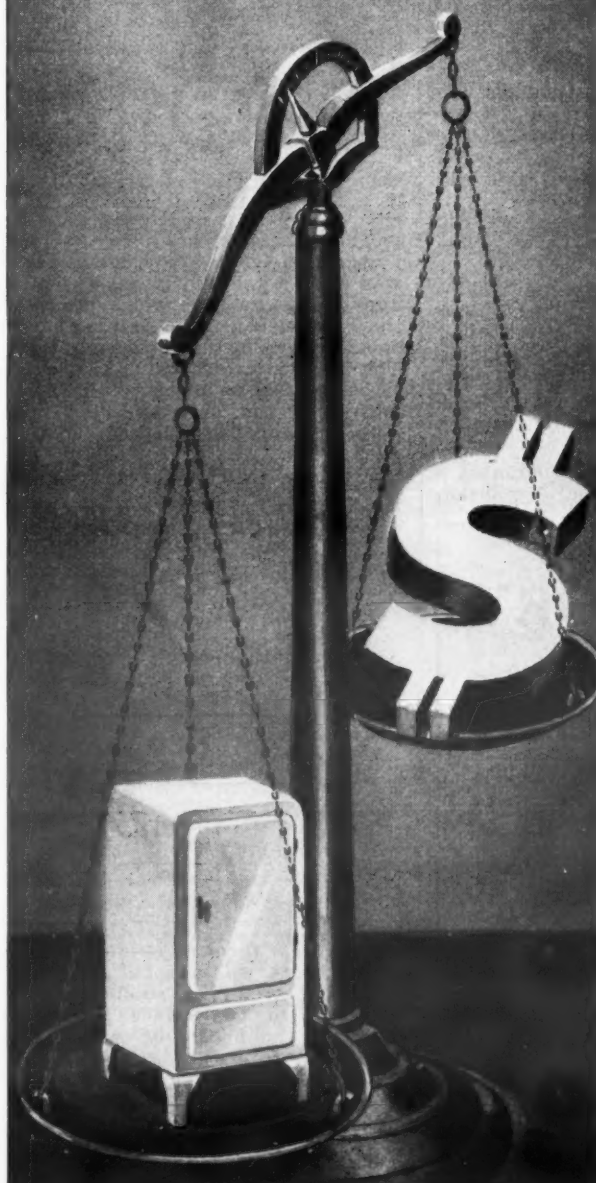
"The results of a complete series of test runs is shown in Fig. 7, where each segment along the curves represents a group of tests at one head pressure. Within a reasonable limit of accuracy the various segments tend to fit into a general curve.

"These general curves are shown in Fig. 8, and they represent the valve capacity over a wide range of pressures with an accuracy of better than 7 per cent.

"To use these curves it is only necessary to know the high-side pressure and low-side pressure at the valve. When these pressures are known only at the compressor it is necessary to make allowance for pressure losses in the liquid line, suction line and evaporator. In addition it is necessary

(Concluded on Page 16, Column 1)

## HEAVING VALUES ARE MAKING SALES IN 1935



THE plants that are running overtime are the plants that give a "heaping" measure of quality. New ideas, improvements, full measure of value are the keys that are unlocking the consumers' pocketbooks.

America's refrigerator industry is one of the world's outstanding examples. Leading the way in "heaping values", it is leading the way to greater sales.

Extra size, extra beauty, extra capacity and extra convenience features—they make a heaping measure of value.

Among these extra features is the quality of rust prevention by Bonderizing. Under the gleaming beauty of lacquer or enamel, it presents an invisible barrier to corrosion. It holds the finish, prevents cracking and chipping and stops the spread of rust around dent or scratch.

This is one of those "heaping values" that help to make sales and which the wise salesman can use with good effect. If the refrigerator you sell is Bonderized, mention it to the prospect. You'll find that it helps to close sales.

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A new book, showing what a refrigerator salesman should know about Bonderizing, is available. It includes charts showing the results of various tests of painted steel samples. Send for your copy.

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*processes*  
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## ENGINEERING

Figure 5.—Sample Data and Calculations

Data:

Date 8-2-34 Test No. 14 Refrigerant—Freon	
Inlet Pressure	120 lbs. per sq. in.
Outlet Pressure	59.5 lbs. per sq. in.
Valve Opening .020 inches—5/32 inch orifice	
Refrigerant Temperature at Valve Inlet	90° F.
Refrigerant Temperature at Evaporator Outlet	85° F.
Water Temperature at Evaporator Inlet	90° F.
Water Temperature at Evaporator Outlet	71.5° F.
Change in Water Temperature in Evaporator	18.5° F.
Rate of Water Flow Through Evaporator	24.9 lbs. per min.

Calculations:

Refrigerating Capacity Under Test Conditions Equals 24.9 x 18.5=	450.7 B.t.u./min.
Subcooling of Liquid Test Conditions .....	8° F.
Superheated Vapor Test Conditions .....	23° F.
Refrigerating Effect Per Pound of Refrigerant at Test Conditions...	59.9 B.t.u./lb.
Pounds of Refrigerant Per Minute Flowing Through Expansion Valve..	7.62 lbs./min.
Refrigerating Effect Per Pound of Refrigerant at 10° Subcooled	
Liquid and 10° Superheated Vapor .....	57.3 B.t.u./min.
Capacity of Expansion Valve at Standard Condition.....	57.3 x 7.62 = 437 B.t.u./min.

## Wile Explains Tests On Expansion Valve

(Concluded from Page 15, Column 5) to allow for loss of head when the compressor is located in the basement several floors below the cooling units.

"When using a general curve of this type the question has been brought up regarding the change in refrigerating effect of the refrigerant when working at a low suction pressure and low head pressure as compared to the same pressure difference at high suction pressure and high head pressure.

"Fig. 9 shows the refrigerating effect of Freon under various conditions of suction and head pressures. When both suction and head pressure are raised, keeping the same pressure difference, the refrigerating effect remains practically constant and results only in negligible errors.

With tests of this nature it is usually desirable to derive some sort of theoretical equation to represent the data in a rational form. Several types of equations might be possible since the exact nature of the flow was not known. The data is best represented, however, by the well known hydraulic formula, thus showing that the refrigerant expanded after leaving the orifice rather than while passing through it.

"The general hydraulic formula is shown in Fig. 10 along with the more simplified form obtained by substituting the density of methyl chloride and Freon.

"When the test data is substituted in these formulas we obtain the coefficient of discharge. This coefficient represents the ratio of the actual flow to the theoretical flow that would be expected under ideal conditions with an orifice having a perfectly rounded entrance and no friction.

"Fig. 10 also shows the percent deviation of the various runs from the average coefficient. The coefficient for water was obtained by measuring the flow of water at various pressures and substituting the results in the hydraulic formula.

"The close agreement of the co-

efficient for water and refrigerants further indicates that the refrigerant's passed through the orifice as practically a solid liquid with expansion of the flash gas taking place later.

"Some effort was made to explain the variation in the coefficient shown in Fig. 10. Obviously it would be desirable to have a formula representing the flow under all conditions with as great accuracy as possible.

"In Fig. 11 the various coefficients are plotted against the specific volume of the refrigerant leaving the discharge side of the valve. This specific volume depends upon the amount of flash gas and it increases as the pressure difference across the valve increases. The various test points lie close to the average curves, certainly within the limit of accuracy of the original tests.

The formula in Fig. 11 is known as an empirical formula because it was derived to fit the data and has no rational meaning like the hydraulic formula. It was therefore somewhat surprising that this formula represented the test data for both methyl chloride and Freon with such a high degree of accuracy.

"The variation of the coefficient of discharge in Fig. 11 may have its explanation in the amount of subcooling of the liquid after it enters the body of the valve. During operation the valve becomes cold and, as will be seen in Fig. 12, the passage of liquid through the body provides an opportunity for cooling before reaching the orifice.

"The effect of this subcooling was previously shown to have an appreciable effect on the capacity. The amount of subcooling can be expected to vary with each operating condition depending upon the following:

"(1) Temperature difference between the refrigerant entering the valve and after expansion.

"(2) Rate of flow through the valve.

"(3) Density, specific heat, and other properties of the refrigerant affecting heat transfer.

"To obtain better accuracy of the discharge coefficient will require further tests to evaluate the importance of each of these factors.

"Fig. 13 shows a cross section of a large size thermostatic expansion

Figure 7

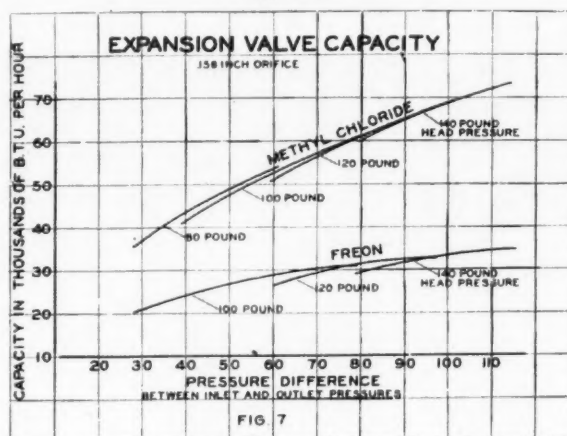
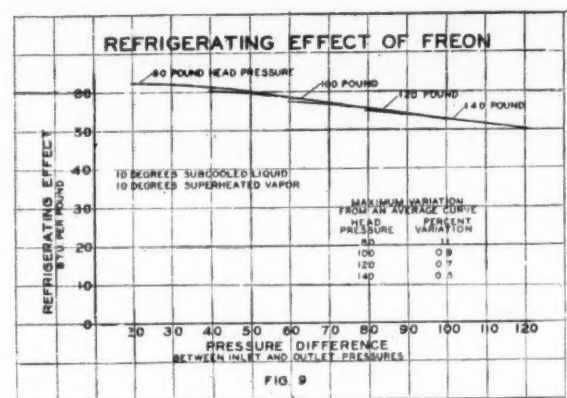


Figure 9



## Thermostatic Valve

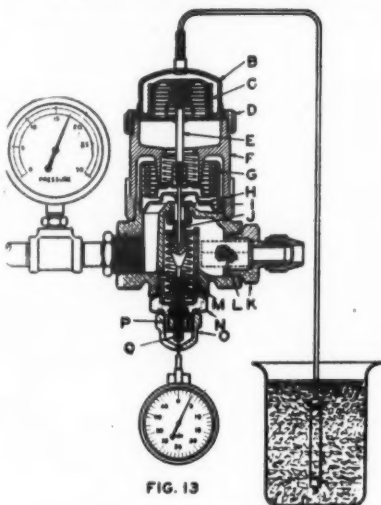


FIG. 13

valve designed to obtain the maximum flow of refrigerant. Special attention was given to the flexibility of bellows and springs so that wide opening of the needle could be produced with small change in the superheat setting. The dial indicator and gauge in Fig. 13 were used to measure the needle movement and determine the maximum opening for 7 degree superheat change.

## Special Needle

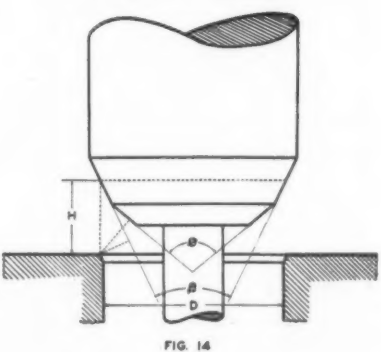


FIG. 14

"A special form of needle construction, Fig. 14, was adopted in order to eliminate as far as possible the obstruction in the orifice. The blunt angle of the needle tip prevents its projection into the orifice and provides considerable increase in flow. The curves in Fig. 15 show the capacity of this valve for various pressures.

"When the capacity of this large

Figure 15

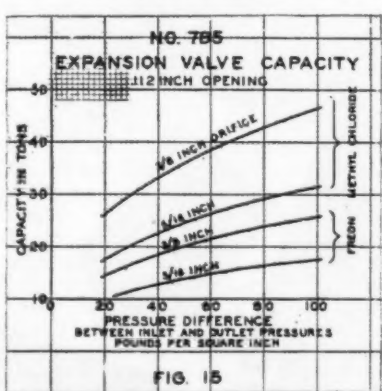


Figure 8

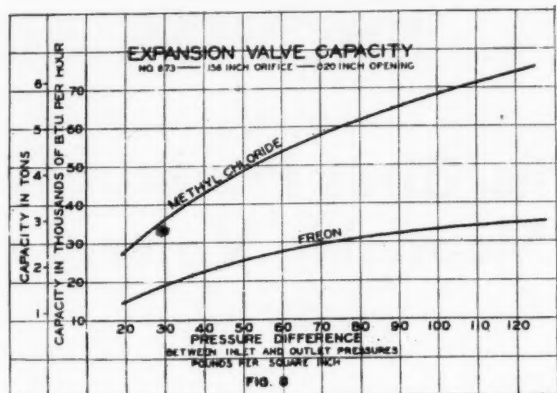
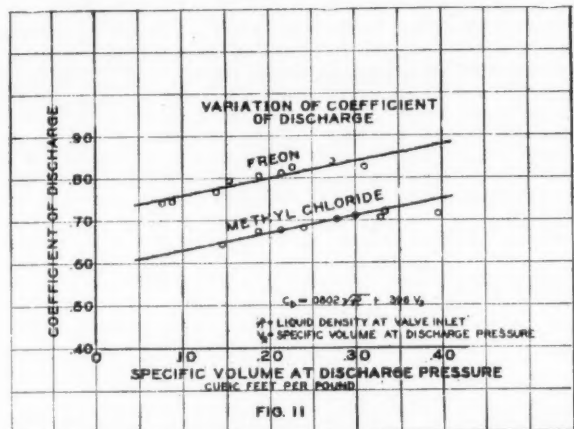


Figure 11



valve was calculated from the formulas derived on the smaller valve we hesitated to use the results. Twenty tons for Freon at 50 pounds head seemed too good to be true. Later, however, two independent series of tests thoroughly justified the calculated ratings.

"In conclusion we wish to again point out the important factors that must be considered when measuring

the capacity of thermostatic expansion valves.

"1. Establish the maximum change in superheat that can be tolerated.

"2. Conduct the tests in such a manner that the valve is held open by an amount comparable to the allowed superheat change.

These requirements must be satisfied in order to insure efficient operation at the maximum rating.

Figure 10—Variation of Coefficient of Discharge

$$M = C_d \times A \times 720 \sqrt{2gP(P_1 - P_2)}$$

Freon				Methyl Chloride			
$M = C_d \times 721 \sqrt{P_1 - P_2}$				$M = C_d \times 585 \sqrt{P_1 - P_2}$			
P <sub>1</sub>	P <sub>2</sub>	C <sub>d</sub>	% Diff.	P <sub>1</sub>	P <sub>2</sub>	C <sub>d</sub>	% Diff.
140	20	.826	+3.9	120	20	.716	+3.4
140	30	.810	+1.9	120	25	.702	+1.4
140	45	.767	-3.6	120	35	.678	-2.0
120	20	.840	+5.7	100	20	.720	+4.1
120	30	.805	+1.3	100	25	.703	+1.6
120	45	.745	-6.3	100	35	.687	-0.7
100	20	.828	+4.2	90	20	.701	+1.4
100	30	.795	0.0	90	25	.683	-1.3
100	45	.740	-6.8	90	35	.644	-6.9
Average .79				Average .69			

M=Pounds of Refrigerant Per Minute  
P=Liquid Density at Valve Inlet Lbs. Per Cu. Ft.  
g=32.2 Feet Per Sec. Per Sec.  
C<sub>d</sub>=Coefficient of Discharge  
A=Actual Orifice Area in Square Feet  
P<sub>1</sub>=Gauge Pressure at Valve Inlet  
P<sub>2</sub>=Gauge Pressure at Valve Outlet  
C<sub>d</sub> For Water = .805

## THE BEST HISTORY

"Happy is the country that has no History," meaning literally, that it has no troubles to record, no failures to conceal, no mistakes to rectify.

Very few business enterprises can truly say they have no history in the sense of the quotation. The years bring problems to solve, developing the wisdom and experience for each solution; skill in craftsmanship increases, permitting new triumphs in manufacture. Business HAS its history as we all know.

At Commonwealth Brass Corporation we pride ourselves on our ability to satisfy the ever-widening demand for Seepage-Proof Fittings for the refrigeration industry and feel that the best history for an organization like ours is a history of service.

We like to think that the performance of Commonwealth fittings has had more than a little to do with today's acceptance of automatic refrigeration as a vital part of modern living.

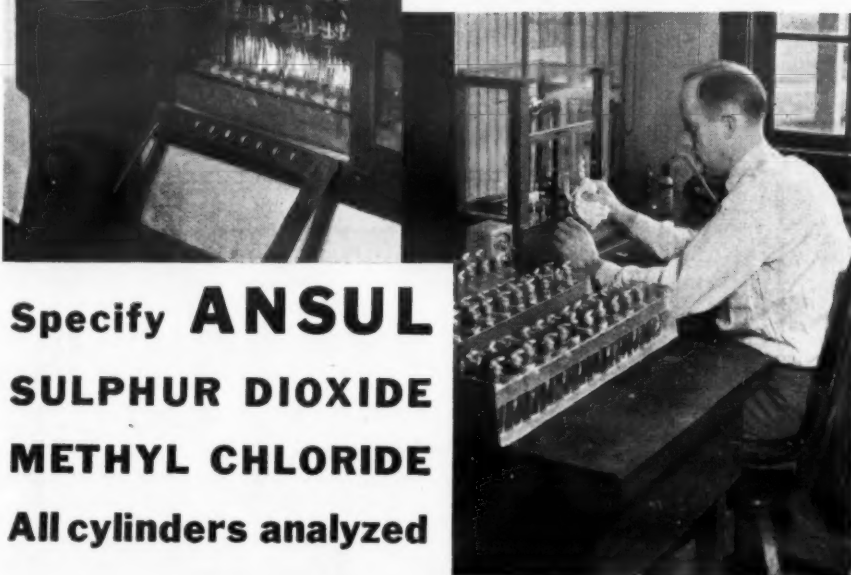
As always, we are ready to help by furnishing fittings correct in design and manufacture so that, insofar as fittings are concerned, there will never be any history of failure to perform.

Write about your requirements for standard, semi-standard or special fittings. We quote promptly and intelligently.

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## Jennings Presents New Data on Absorption Unit Operation

DETROIT—Realization that for certain applications absorption refrigeration is very suitable has brought about a definite revival of interest in this form of refrigeration, it was pointed out by B. H. Jennings of Lehigh university in addressing the Thursday morning session of the A.S.R.E. meeting here last week on the subject of "New Investigations in Absorption Refrigeration."

"In the field of very low temperatures, units of this type have always given noteworthy performance, but in the field of higher temperatures an even better performance, measured in cost per ton of refrigeration and in capacity of a given unit, is possible," stated Mr. Jennings.

"The thought of using a steam boiler in winter for heating and perhaps supplying a moderate refrigeration load and in summer for carrying a large refrigeration load with practically no heating, offers attractive potentialities. This arrangement is economically possible for absorption refrigeration, even with low steam pressures found in many of the smaller boilers used for heating.

### Low Operating Costs

"It is also true that operating costs for absorption units are often very low. This is particularly so where fuel costs are low in contrast to power costs. Finally, present day automatic controls are developed to such an extent that absorption refrigeration units can be made completely automatic."

Mr. Jennings' paper presented some of the theoretical background of absorption refrigeration worked into convenient form for making calculations and a report of some experimental work done on a 6-ton unit.

### Steam Operated Units

Refrigeration unit employed in these tests was designed to use steam from a domestic heating boiler or other suitable source of steam supply at pressures of from 0 to 15 lb./in.<sup>2</sup> gauge.

The unit tested was rated at 6 tons of refrigeration when supplied with steam at 10 lb./in.<sup>2</sup> gauge, with 85° F. circulating water supply and operating with a 30 lb./in.<sup>2</sup> gauge (16.6° F.) evaporator.

The unit was compactly built and could be completely automatically controlled. On tests, however, the control was purposely made largely manual. Ammonia was used as a refrigerant in all tests with water as the absorption agent.

### Cycle of Operation

The cycle of operation is similar to that of a conventional absorption refrigeration machine. In Fig. 1, a diagrammatic outline of the unit, it can be seen that ammonia from the condenser goes through the expansion valve to the evaporator, from which the resulting vapor passes to the absorber, where on coming into contact with a weak ammonia solution it is absorbed and a strong ammonia solution results. During the process of absorption the heat generated is removed by the circulating water.

Strong ammonia liquor (aqua) at absorber (evaporator) pressure enters the aqua pump where it is elevated to the head pressure of the system, and on leaving the pump passes through a double-pipe heat exchanger before entering the generator.

In the shell-and-tube type generator the strong aqua is heated by steam supplied from a suitable boiler furnace. The heat given up by the steam drives off the ammonia from the aqua, thereby reducing its concentration so that the weakened aqua can then be started on its way back to the absorber.

### Remove Steam from Ammonia

The vapor driven off in the generator is not free ammonia, but has some steam mixed with it. To remove this steam the vapor mixture is led into a water cooled rectifier. Here the mixture is cooled to within 10 to 30° F. above the ammonia condensing (saturation) temperature.

During this cooling the greater part of the steam is condensed and drips back into the generator, although in so doing some of the ammonia vapor is also re-absorbed. The relatively anhydrous ammonia gas, leaving the rectifier, passes to the condenser from which as liquid it is supplied to the expansion valve and then expands into the evaporator, thus completing the cycle.

### Motor-Driven Aqua Pump

The reciprocating-type aqua pump was motor driven. This pump constitutes the only mechanically operated part of the unit and required very little power. The ½-hp. motor used for this 6-ton unit was found amply large.

"Refrigeration developed was measured by weighing brine and accurately measuring its temperature change," Mr. Jennings explained.

"Steam used was measured by weighing the condensate. Circulating water was measured by means of frequently calibrated nozzles.

"Before and during the conduct of these tests an extensive search was made into the previously published literature on absorption refrigeration. Very little of recent date has been published in English, although there have been rather numerous recent articles in the German technical press. Most of the data from any source had to be worked into more convenient form before they could be used. Such material was then available to ascertain where test runs should be made and to aid in verifying trends from various results found.

"For a given arbitrary absorber (evaporator) pressure and a given weak liquor temperature leaving the

## Variation in Weak Liquor Rate

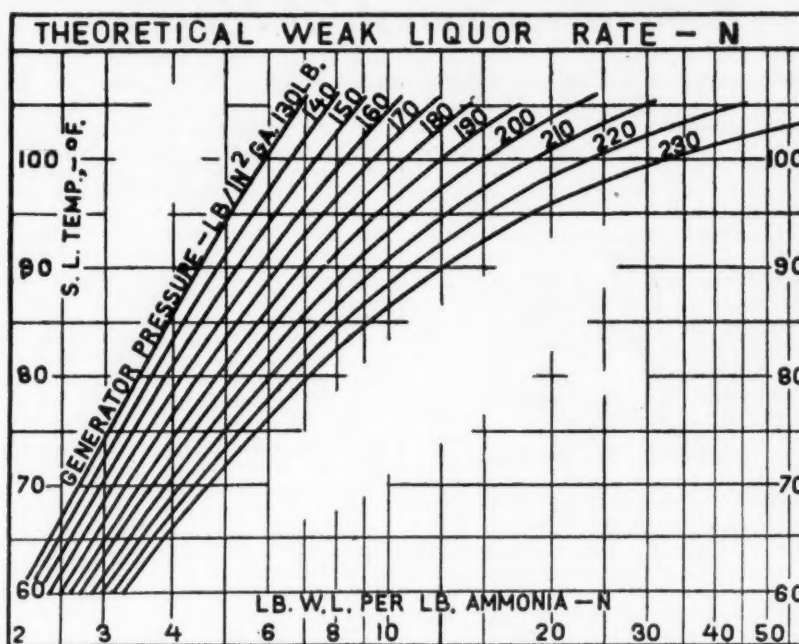


Figure 5. Curves based on absorber pressure, 25 lb./in.<sup>2</sup> gauge; generator temperature of 225° F.

generator it is possible to plot a series of curves showing how weak liquor required per lb. of anhydrous ammonia varies with generator (condenser) pressure and with temperature of strong liquor leaving the absorber. Such curves are plotted in Fig. 2.

"It is of interest to note that with say 90° F. aqua leaving the absorber an increase in head (generator) pressure of the system of say from 180 to 190 lb./in.<sup>2</sup> causes an increase in aqua rate of from 6.93 to 7.65 (0.72 lb.), whereas an increase in aqua temperature of 5° to say 95° F. at 180 lb./in.<sup>2</sup> would cause an increase in aqua rate from 6.93 to 8.53 (1.60 lb.).

"This shows the relatively greater effect of temperature changes on aqua rates than of that of head pressure changes."

### Difference in Heat

According to Mr. Jennings, the heat that must be removed in an absorption refrigeration machine is different from that which must be removed in a compression system by virtue of:

- (1) Heat of chemical absorption of the ammonia in the aqua.
- (2) Necessary cooling of weak aqua before absorption, a small item when effective heat exchangers are employed.
- (3) Heat to condense steam (or other carrying medium) leaving in vapors from the generator and the resulting heat of re-absorption when this condensed steam re-absorbs some refrigerant vapor.

### Condenser Load Same

The condenser load is essentially the same in the two systems.

"A first conclusion from these data would point to the questionable conclusion that because more heat must be removed the absorption system required much more circulating water than the compression system, but such is not necessarily the case," stated Mr. Jennings.

"Given a moderately cold circulating water supply (70° F. or less) in an absorption system, the water can progressively be passed through the various parts of the system in series, that is, through condenser, absorber, weak-liquor cooler, and rectifier.

"The leaving water temperature will be much higher than could economically be used in a compression system, yet the effectiveness of the absorption arrangement would not be decreased.

### Water Requirement

"Under these conditions the water requirements (gal./min.) would be about equal for either system.

"When relatively warm water must be supplied as for summer operation with a cooling power (85° F. or higher), it becomes no longer economical to run the water in series arrangement through all the sections of the unit and a higher rate of flow (gal./min.) is required by the absorption unit. But in this case if water is being used with a cooling tower this higher rate of flow is not objectionable as relatively little make-up is required. Power costs for pumping would, in most cases, be but slightly greater in the case of the absorption unit.

### Means for Economical Operation

"Economical operation of an absorption unit cannot occur unless the amount of aqua circulated per pound of anhydrous ammonia be kept reasonably small.

"The amount of aqua which must be circulated depends on the difference in concentrations of the strong and weak aqas. These concentrations depend in turn on the temperature and pressure in the absorber and in the generator.

"If either low evaporator (absorber) pressures are required or if the absorber circulating water is high in temperature the concentration of the

plied, improved performance can only be obtained with increased steam pressure. It may be said that with evaporator temperatures not below 10° F. and with 85° F. circulating water, steam pressure need not be higher than 15 lb./in.<sup>2</sup> gauge to give a reasonable performance.

### Lower Temperatures

"For lower evaporator temperatures either colder circulating water or higher steam pressures would be required to give economical operation and normal capacity for a given machine. Steam pressures in excess of 50 lb./in.<sup>2</sup> gauge should never be employed as excessive foul gas formation may occur."

The performance of an absorption machine, said the speaker, improves appreciably if colder circulating water is available. The improvement occurs in both economy and increased capacity.

### Energy Requirements

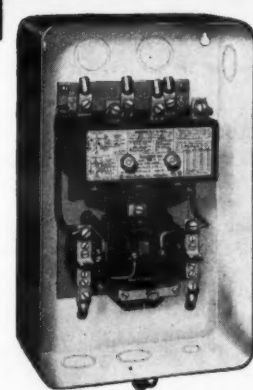
"Comparisons are often made between the energy supplied to a compression machine and the energy supplied to an absorption machine," declared Mr. Jennings. "Using a basis of 1 ton of refrigeration a compression machine requires on the average about 1.0 to 1.4 kw. or say 1.2 x 3,415 = 3,998 B.t.u./ton hour.

"An absorption machine using about 35 lbs. of steam per ton hour at say 10 lb./in.<sup>2</sup> gauge would use about 35 x h(fg) = 35 x 952 = 33,320 B.t.u.; adding aqua pump input of about 1,000 B.t.u.'s gives 34,320 B.t.u.'s/ton hours of refrigeration.

"In comparing these figures of 3,998 vs. 34,320 it must be kept in mind that the absorption machine is a reversed heat engine, and that thermodynamically its heat consumption should be compared with the heat consumption of the heat engine (turbine) required to produce the 1.2 kw. for the compression machine.

"Central station units use from (Concluded on Page 18, Column 1)

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Although they are the smallest starters on the market for their capacity, they easily disrupt ten times maximum rated current at listed voltage.

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Contact  
Dressing



"Never Clean, File, or Dress These Contacts" reads the warning on Allen-Bradley starters. No insulating oxide can possibly form on their silver-alloy contacts, so it is unnecessary to "dress" them, even after long service!

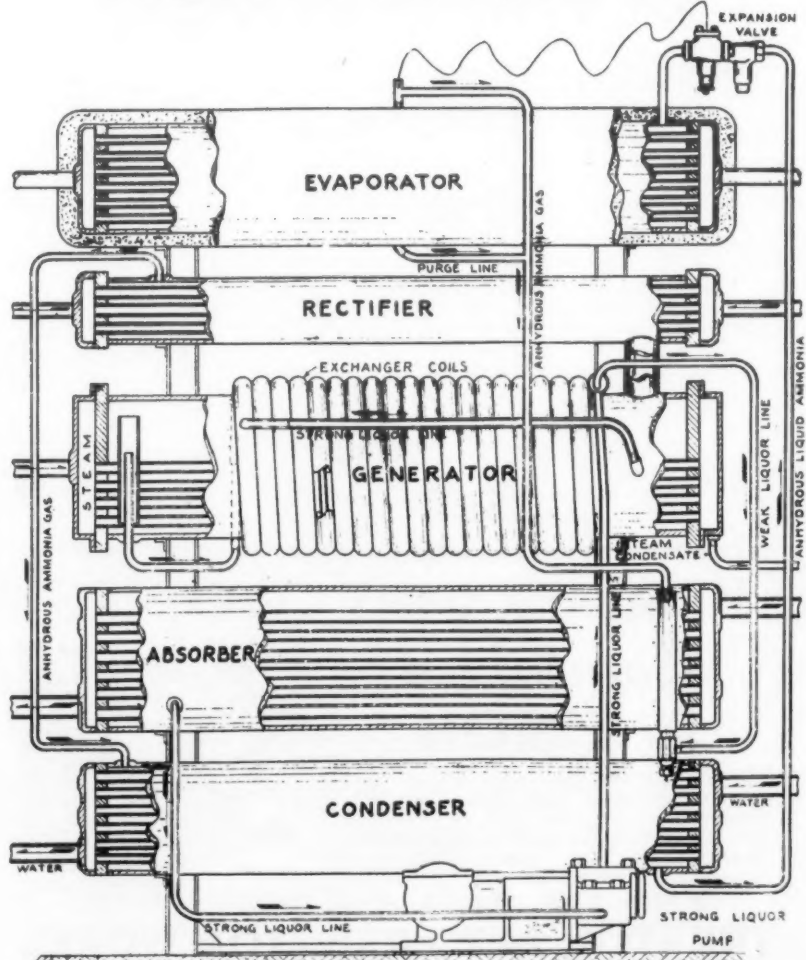


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## Diagram of Absorption Unit



Diagrammatic section of absorption unit used in investigations which Mr. Jennings reports.



## Jennings Reports on New Investigations Of Absorption Units

(Concluded from Page 17, Column 5)  
11,000 B.t.u./kwh. in the better stations to 40,000 in the smaller ones. Expressed in heat units this would mean from 13,200 to 48,000 B.t.u./ton hours for the compression unit vs. the 34,320 B.t.u.'s for the absorption unit. This comparison, it must be realized, is also based on the 10 lb/in<sup>2</sup> steam supply for the absorption unit as against 200 to 600 lb/in<sup>2</sup> in the conventional power plant.

"Most of the tests were run with 85° F. water supply to the unit. This represents a reasonable maximum temperature which can be maintained with cooling tower operation in summer weather except in the southern-most states.

### Steam Pressure Used

"Steam pressure was carried at 10 lb/in<sup>2</sup> gage, a pressure readily obtainable from domestic or heating boilers as well as from high pressure boilers by using a reducing valve. Evaporator pressures were varied in many tests carried at about 25 lb/in<sup>2</sup> gage.

"It is true for practically any refrigeration machine that lowering evaporator pressure decreases capacity. However, in the case of the absorption machine, if it is possible to increase steam pressure or provide lower temperature water or even greater quantity of cooling water, capacity can be maintained at practically normal with the lower evaporator pressure.

"Water requirements vary over wide limits, depending on the circuit used and the initial temperature. The tests run have shown water requirements to be a maximum of 94.5 gal./min. degrees with 85° F. inlet water, lower inlet water temperatures giving lower maximum values. With a 10° F. rise this would require 9.45 gal./min./ton, with a 20° F. rise (easily possible with series arrangement in an absorption unit) 4.73 gal./min./ton.

### Conclusions

In conclusion it may be well to summarize the following items:

"1. Tests have shown the operating costs of an absorption system to be very low where fuel (or steam) is relatively cheap.

"2. Present day advances in automatic controls have made it possible to make what was formerly a relatively complex refrigeration system into one which can be very easily controlled.

"3. It is possible for air-conditioning work to utilize the heating boiler for winter operation as the absorption-refrigeration boiler for summer operation, thereby permitting lower equipment investment.

"4. In the low temperature field absorption refrigeration is very suitable and compares favorably with compound-compression unit performance."

## Committee Report on Proposed New Ratings for Industrial Machines

DETROIT—Report of the A.S.R.E. Committee on Standards of Measurement, proposing a new method of rating industrial refrigerating systems different from the long-established standard ton rating, was read by A. B. Stickney, Armour & Co., at the final technical session of the spring meeting in convention here last week.

Mr. Stickney's report will probably come up for final consideration by the society at the next meeting of the A.S.R.E. to be held this winter in New York City.

Proposals of the committee on ratings are as follows:

### 1. Units of Refrigeration

1.0 A ton of refrigeration is removal of heat at a rate of 12,000 mean British thermal units per hour.

1.1 A recognized alternative method of expressing rate of removal of heat is in (—) B.t.u./hr.

1.2 A ton-day of refrigeration is the quantity of heat removed when a rate of 1 ton is operative for 1 day, or —288,000 B.t.u. This is approximately equivalent to the latent heat of fusion of 1 ton (2,000 lb.) of ice.

1.3 A recognized alternative method of expressing quantity of heat removed is (—) B.t.u.

1.4 The relationships of these units to other units of measurement of refrigeration are as follows:

- 1 ton = —200 B.t.u./min.
- 12,000 B.t.u./hr.
- 288,000 B.t.u./day
- 1 ton ice melting effect per day
- 12 Mbh. (as defined by the A.S.H.V.E.)
- 900372 British commercial tons
- 3023.9 Kg. cal./hr.
- 3023.9 (French) Frigorios/hr.
- 1 standard commercial ton (obsolete)
- 0.0008333 tons
- 2520 Kg. cal./hr.
- 2520 (French) Frigorios/hr.
- 1667 lb. ice-melting effect per day
- 1 ton-day = —288,000 B.t.u.
- 1 ton ice-melting effect
- 831 British theoretical units of refrigeration
- 72,575 Kg. cal.
- 72,575 (French) Frigorios
- 1 B.t.u. = —0.0003470 ton-days
- 0.06940 lb. ice-melting effect
- 2520 Kg. cal.
- 2520 (French) Frigorios

### 2.0 Standard Method of Rating an Industrial Refrigerating System or Machine

2.1 The range in which an industrial refrigerating system or machine is operating is defined by the statement of two factors:

- a) The temperature level from or at which heat is absorbed, hereafter called the lower level ( $t_1$ ).
- b) The temperature level to or at which heat is rejected, hereafter called the higher level ( $t_2$ ).

2.2 Standard conditions exist when:

- a) All of the heat causing the refrigerating effect is absorbed exactly at the lower level, and no more heat could be absorbed at this level by the refrigerant (in a compression system, dry saturated suction gas).

b) All of the heat rejected is rejected at or above the higher level, and no more heat could be rejected at this level by the refrigerant (in a compression system, saturated liquid at condenser pressure at the inlet of the expansion valve).

Unless otherwise stated, it is considered that an industrial refrigerating system or machine is rated at Standard Conditions.

2.3 The standard method of rating an industrial refrigerating system or machine consists of a statement of three rates, as follows:

a) The capacity of the system or machine in tons (or B.t.u./hr.) when operating over any stated range.

b) The rate of increase of capacity, in tons (or B.t.u./hr.) per unit change upward of the lower level, with the higher level held constant.

c) The rate of decrease of capacity in tons (or B.t.u./hr.) per unit change upward of the higher level, with the lower level held constant.

These three items are written in order thus: Between  $t_1$  and  $t_2$ ,  $x$  tons;  $+y$  tons/1° increase of  $t_1$ ;  $-z$  tons/1° increase of  $t_2$ .

2.4 In cases where the refrigerant evaporation and condensation temper-

atures determine the lower and higher levels, and there is an accepted table of thermodynamic properties of the refrigerant used covering the range of use, the range may be stated by stating the suction and discharge pressures ( $p_1$  and  $p_2$ ).

2.5 Correction for conditions other than standard in general fall under two heads, namely:

a) Correction for variations in the refrigerating effect per unit weight of refrigerant handled which may be due to one or both of the following:

1) The refrigerant has absorbed heat above the lower level (in a compression system superheated suction gas) or could absorb more heat at the lower level (in a compression system, wet section gas).

2) The refrigerant has rejected below the higher level (in a compression system, sub-cooled liquid) or could reject more heat at the higher level (in a compression system, liquid seal broken, uncondensed gas coming to the expansion valve).

In either case correction to standard conditions can be made by multiplying by the ratio:

Corrections from standard conditions can be made by dividing this ratio.

refrigerating effect per unit wt. of refrigerant with standard conditions

refrigerating effect per unit wt. of refrigerant with actual conditions

b) Correction for variation in the weight of refrigerant handled per unit of time, because the refrigerant has absorbed heat above the lower level (in a compression system, superheated suction gas) or could absorb more heat at the lower level (in a compression system, wet suction gas). In either case, correction to standard conditions can be made by multiplying by the ratio:

weight handled per unit time with standard conditions

weight handled per unit time with actual conditions

Corrections from standard conditions can be made by dividing by ratio.

### Revolving Shelf Built by Union Steel Products

ALBION, Mich.—A revolving shelf, designed for use in electric refrigerators, has been introduced by the Union Steel Products Co. of this city.

The shelf is a network of heavy wire and steel with welded joints.

In its normal position, the shelf is held securely in place, but the bracket mounting with a center swivel permits it to be swung easily.

## Notes on Technical Sessions At A.S.R.E. Convention

By Phil B. Redeker

Harry Harrison in his capacity as chairman of the opening technical session, made a plea for lively discussion at the session, pointing out that in the old days such discussions got so hot that a sergeant-at-arms was necessary to preserve order.

One who took Mr. Harrison at his word was S. C. Bloom, consulting engineer from Chicago. He was on his feet right after the opening paper (F. O. Urban of General Electric on the new psychrometric chart) challenging right and left on the subject of "what happens at the triple point, 32° F." which most makers of psychrometric charts seem to have glossed over.

Believing that he had seen the author of Bulkeley's psychrometric chart in the convention room, he wanted Mr. Harrison to appoint a sergeant-at-arms to bring Mr. Bulkeley back into the meeting to defend his chart.

Mr. Bulkeley was not to be found, however, so Mr. Bloom pounced on Dr. E. Vernon Hill, the Chicago consultant on air-conditioning problems. The discussion wandered away from the point, but Messrs. Bloom and Hill were finding plenty of other subjects upon which to fence, with A. R. Stevenson and Gardner Voorhies helping them along.

Later in the session Mr. Bloom and Dr. Hill found themselves not in agreement on the subject of the amount of fresh air needed in an air-conditioning system for proper odor control.

Both gentlemen tend to the low percentage side, but Dr. Hill thinks that the amount can be even less than 2 c.f.m. per person which is getting too low to suit Mr. Bloom.

One of the points of this argument seemed to center about the matter as to whether you could expect "normally clean individuals" (those who bathe frequently) to inhabit air-conditioned dwellings. Perhaps a national survey on the cleanliness factor will be necessary.

The critical attentiveness of the engineers at the technical sessions seems to make the best of speakers a trifle nervous. Even Dan Wile, whose speaking style and poise have always been a matter for admiration, had a little difficulty getting under way. However, after he made one tongue trip (he called "flash gas—flash gas") he turned in an errorless performance and got the most resounding round of applause given any speaker at the convention.

Joe Askin, chief engineer of Fedders Mfg. Co., was an attentive listener while Dan Wile was giving his paper. He later got to his feet to say that research in Fedders' laboratories was in line with the conclusions drawn by Mr. Wile.

In his closing remarks Harry Harrison, A.S.R.E. president, pointed out that the attendance at the final technical session was the largest of the whole convention, a feat unprecedented in A.S.R.E. convention history. Mr. Harrison sent the conventionites away chuckling with a swell Scotchman joke.

The report of the committee on standards of measurement proposing a new method of rating industrial machines apparently isn't going to be pushed through hurriedly.

Mr. Stickney's able report (which represented what must have been a tremendous amount of work) drew out some sharp discussion.

Opposition to the proposed new system seems to come from two groups: (1) those who believe in the philosophy of "the fewer laws and rules the better" and (2) those who are still slightly skeptical about scrapping the "standard ton" conditions for the new method.

Closely questioning B. H. Jennings, who spoke on absorption refrigeration, was Dr. W. L. Hainsworth of Electro-

lux. Some of Dr. Hainsworth's comments seemed to be indicative that the Electrolux of the future will involve the results of current research work.

Following the paper by D. P. Heath on the McCord propane system, some members challenged the capacity of the unit described to air condition a passenger bus.

This was explained when it was pointed out that the system is so designed and constructed as to give cool comfort to the individual passenger, without completely controlling temperatures and humidities within the entire bus.

"Bus companies with runs across the desert areas in the southwest say that it is almost a daily occurrence in the summer for at least one passenger to go 'heat crazy' and take off across the desert," Mr. Heath stated.

There's gold in them thar' trails for air-conditioning prospectors.

## Air Conditioning & Standards Studied At A.S.R.E. Meeting

(Concluded from Page 1, Column 1)

a good deal of discussion followed. S. C. Bloom, Chicago consulting engineer, outlined several trends which the air-conditioning industry may take, and C. D. Haven of the Thermopane Co. presented the results of some tests on window glass as insulation.

Commercial refrigeration developments occupied the attention of the members at Thursday's session. H. C. McPherson, Kroger Grocery Co. engineer, told how refrigerated display windows can be made to operate effectively. Report of new investigations of absorption refrigeration systems in commercial sizes was given by B. H. Jennings of Lehigh University. D. P. Heath of McCord Radiator & Mfg. Co. described new developments in the propane fuel-refrigeration system for trucks and passenger buses which McCord is making.

Headlining the entertainment was the "Refrigeration Fiesta" Wednesday night at the offices of ELECTRIC REFRIGERATION NEWS. Members of the staff served as hosts, with the girls in "senorita" costumes to lend color to the affair (see pictures throughout the issue).

Approximately 400 engineers and Detroiters connected with the industry were treated to a full evening's entertainment with professional entertainers, dancing, and refreshments.

Thursday afternoon the guests visited Henry Ford's famed Greenfield village. This was followed by a dinner at Dearborn Inn, with entertainment later in the evening furnished by the Kelvinator entertainers, a group of employees under the direction of Fred Hulburd of the sales promotion department.

Papers presented at the technical sessions can be found on the following pages:

"The Psychrometric Chart," F. O. Urban, General Electric Co. (Page 8).

"Some Trends in Air Conditioning," S. C. Bloom, consulting Engineer, Chicago (Page 6).

"Window-Glass as Insulation," C. D. Haven, The Thermopane Co., Toledo (Page 6).

"Refrigerated Display Windows," H. C. McPherson, Kroger Grocery Co. (Page 11).

"New Investigation of Absorption Refrigeration," B. H. Jennings, Lehigh University (Page 17).

"Industrial Machine Standards," A. B. Stickney, Armour & Co. (Page 18).

"Testing the Capacity of Expansion Valves," D. D. Wile, Detroit Lubricator Co. (Page 15).

Reports on "Motor Truck Refrigeration and Fuel," by D. P. Heath, McCord Radiator & Mfg. Co., and "Rational Development and Rating of Extended Cooling Surfaces," by H. B. Pownall, York Ice Machinery Corp., will be made in future issues.

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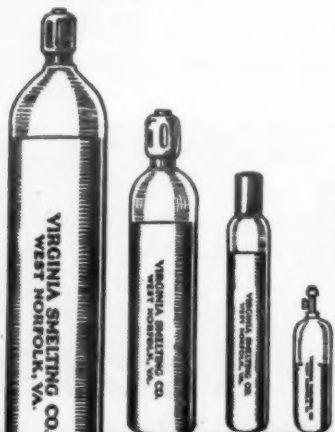
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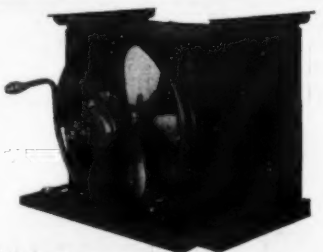
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## PATENTS

Issued May 14, 1935

2,000,944. REFRIGERATOR ARTICLE RECEPTACLE. Harold H. Gilbert, Mount Clemens, and John R. Replogle, Detroit, Mich., assignors, by mesne assignments, to Copeland Refrigeration Corp., Mount Clemens, Mich., a corporation of Michigan. Application Jan. 11, 1932. Serial No. 585,890. 1 Claim. (Cl. 312-173.)

A refrigerator comprising an insulated cabinet having a door opening, a door for said opening, an article container comprising upper and lower frame members secured on the inside of said door, and a pan having flanged edges supported on the lower one of said frame members and providing a bottom closure member for said container.

2,001,028. DEFROSTING SYSTEM. William R. Kitzmiller, Waynesboro, Pa., assignor to Frick Co., Waynesboro, Pa., a corporation of Pennsylvania. Application Sept. 8, 1931. Serial No. 561,800. 10 Claims. (Cl. 62-2.)

1. A cooler having means for circulating a refrigerant therethrough with a valve for controlling circulation of the refrigerant and a fan for moving a fluid to be cooled over refrigerating surfaces of the cooler, a motor for operating said fan, the load on said motor varying directly in response to a pressure head built up through the passage of the fluid to be cooled by an accumulation of frost on the said cooling unit, said variation of the load on the motor being in control of the said valve whereby the said valve will be closed when frost has covered the cooler to a predetermined degree, the fan continuing to operate after closing of the valve to thaw out the frost on the cooler, substantially as set forth.

2,001,028. DEFROSTING SYSTEM. William R. Kitzmiller, Waynesboro, Pa., assignor to Frick Co., Waynesboro, Pa., a corporation of Pennsylvania. Application Sept. 26, 1932. Serial No. 634,947. 9 Claims. (Cl. 62-4.)

1. A device for defrosting a cooler comprising means for circulating refrigerant through the cooler, a fan adapted to circulate air over the cooler, a motor for operating said fan, the load on said motor varying as a result of the increase in the pressure head in the cooler when the cooler becomes heavily coated with frost, and means controlled by variation in the load on said motor for stopping circulation of refrigerant through the cooler and for causing the circulation of a warm fluid therethrough to hasten defrosting of the evaporator, substantially as set forth.

2,001,083. CHILLING DEVICE. Charles T. Walter, Chicago, Ill., assignor to Industrial Patents Corp., Chicago, Ill., a corporation of Delaware. Application Aug. 10, 1933. Serial No. 684,532. 7 Claims. (Cl. 257-88.)

2. A chilling device comprising a cylindrical shell constituting an outer cooling element and provided at its ends with heads having central tubular extensions, the central tubular extension of one of the heads being enlarged to form an interior annular recess, a thrust bearing mounted in the said recess, a hollow rotary cylinder constituting an inner cooling element and having hollow shafts mounted in the tubular extensions of the said heads, one of the hollow shafts being provided with an enlargement forming a shoulder abutting the thrust bearing, means for introducing a liquid into the

shell adjacent the other head, said inner and outer cooling elements forming a capillary space between them for the passage of the liquid and the capillary space being adapted to cause a drop in the pressure of the liquid and produce an end thrust against the said bearing, means for circulating a refrigerant interiorly of the rotary cylinder, and means for circulating a refrigerant exteriorly of the said shell.

2,001,084. HEAT EXCHANGE DEVICE. Charles T. Walter, Chicago, Ill., assignor to Industrial Patents Corp., Chicago, Ill., a corporation of Delaware. Application July 9, 1934. Serial No. 734,263. 16 Claims. (Cl. 257-96.)

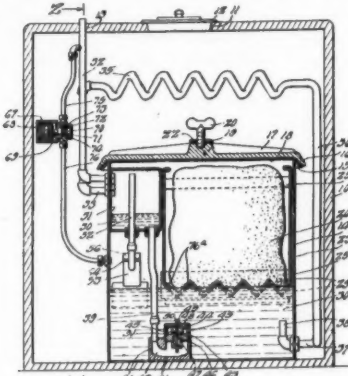
1. A heat exchanger for chilling fluid products including an outer casing having an inlet and an outlet for the passage of the product into and out of the casing, a hollow rotor mounted within the casing and spaced therefrom to form a narrow intervening space for enveloping the rotor within a thin sheet of the product to be chilled, means for introducing a refrigeration medium into the rotor, means for removing it therefrom, and means operating within the narrow intervening space between the rotor and the outer casing for removing frozen material from the surface of the rotor whereby the same is maintained at maximum efficiency.

2,001,085. HEAT EXCHANGE DEVICE. Charles T. Walter, Chicago, Ill., assignor to Industrial Patents Corp., Chicago, Ill., a corporation of Delaware. Application July 25, 1934. Serial No. 736,828. 21 Claims. (Cl. 257-89.)

1. A heat exchange device including a main cylindrical shell having an inlet and outlet for the introduction and removal of a fluid product to be chilled or heated and a hollow cylindrical rotor arranged within the main shell and spaced therefrom to provide an intervening space for the said fluid product, said rotor being provided with an inlet and an outlet for the passage of a chilling or heating medium, and cleaning means located in the intervening space between the main shell and the rotor and having a rolling contact with the shell and the rotor for cleaning the surfaces thereof without scraping the same, said cleaning means also supporting the rotor for rotative movement.

2,001,105. REFRIGERATOR AND TEMPERATURE CONTROL DEVICE. Virginius W. Moody, Brooklyn, N. Y., assignor of two-thirds to Reynolds Metals Co., New York, N. Y., a corporation of Delaware, and one-third to Robertshaw Thermostat Co., Youngwood, Pa., a corporation of Pennsylvania. Application June 22, 1933. Serial No. 677,006. 8 Claims. (Cl. 62-91.5.)

1. In a refrigerating system energized by a substance disposed to gasify when heated, a body of circulatory cooling



2,001,105

fluid dissipating heat to said substance, a circulatory system through which said fluid circulates and having an intake end leading from said fluid body and an end discharging into said body, means for effecting a pressure from said gas for forcing said liquid into the intake end of said circulatory system, and means permitting the discharge of said circulatory system into said fluid body only incident to a selected state of depletion of said fluid body.

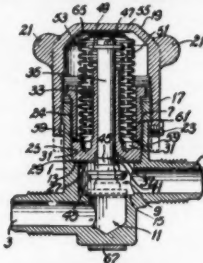
2,001,199. REFRIGERATOR. Herman W. Kleist, Chicago, Ill., assignor to Dole Refrigerating Machine Co., Chicago, Ill., a corporation of Illinois. Application Oct. 12, 1931. Serial No. 568,221. 4 Claims. (Cl. 20-56.5.)

1. A refrigerator comprising an insulated casing, an observation section associated therewith comprising a plurality of glasses arranged side by side and separated from each other, supporting members for said glasses, means for compressing the edges of the glasses between said supporting members to form air tight joints, and means associated with said supporting members but separate therefrom for automatically adjusting them to compensate for expansion and contraction of the glasses due to variations in temperature.

2,001,251. VALVE. Philip L. Irving, Port Huron, Mich., assignor to Mueller Brass Co., Port Huron, Mich., a corporation of Michigan. Application July 30, 1934. Serial No. 737,616. 4 Claims. (Cl. 251-31.)

2. A valve comprising a hollow body, a valve seat in said body, inlet and outlet means disposed on opposite sides of said valve seat, said body being open at one end, an element threaded into the open end of said body and having a bushing, a valve stem slidable in said bushing, said valve stem carrying at one end a valve closure element adapted to seat upon said valve seat, spring means tending to maintain said closure element off said valve seat, a collapsible bellows element surrounding said valve stem, spring means and bushing, said bellows element being closed at one end and outwardly flared at the other end, a plug threaded into the open end of said body and clamping the flared end of the bellows element between itself and said first-named element, the closed end of the bellows abutting the end of the valve stem, and a cap threaded to said body, said cap being adapted interiorly to engage the closed end of said bellows, whereby

threading of said cap down said body moves said valve stem against the reac-

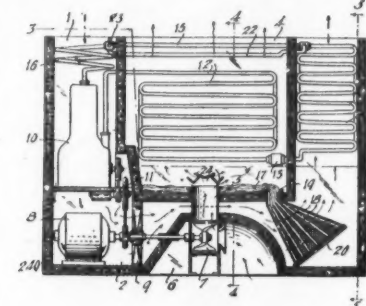


2,001,251

tion of said spring means to seat said valve closure element on said valve seat, and whereby threading of said cap up said body permits said spring means to move said valve stem to unseat said valve closure element from said valve seat, said first-named element having a counter-bored portion providing a back-seating valve seat, and said valve closure element having a back-seating portion thereon adapted to cooperate with said back-seating valve seat under the influence of said spring means.

2,001,309. AIR CONDITIONER. Charles P. Kelly, Newark, N. J. Application Oct. 28, 1933. Serial No. 695,566. 3 Claims. (Cl. 62-129.)

2. In an air conditioner, a refrigerating unit including an evaporator and two connected condenser sections, means for



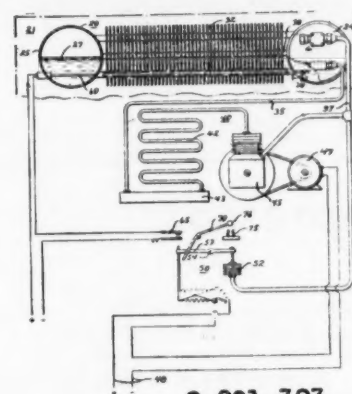
2,001,309

circulating air to be treated into contact with said evaporator to cool the air, a water collector and diffuser for collecting and diffusing water for condensation from said evaporator, and means for circulating air into contact with one of said condenser sections to heat the air, thence into contact with said collector and diffuser to evaporate the water and thereby cool the air and then circulating the cooled air over the other condenser section to cool the refrigerant gas.

2,001,323. REFRIGERATING APPARATUS. Herman J. Dick, Dayton, Ohio, assignor, by mesne assignments, to General Motors Corp., a corporation of Delaware. Application April 29, 1931. Serial No. 533,739. 9 Claims. (Cl. 62-4.)

1. An intermittently operated refrigerating system comprising in combination a

cooling element, a refrigerant circulating



2,001,323

element adapted to supply refrigerant to said cooling element, said cooling element being maintained normally below a predetermined temperature range, means responsive to normal conditions within said system for controlling the operation of said refrigerant circulating element, an artificial heating element located within the walls of said cooling element and arranged to apply its heat directly to refrigerant in the cooling element for defrosting said cooling element, and means for simultaneously rendering said heating element effective and for rendering said first named means ineffective to normal conditions within said system.

2,001,403. REFRIGERATOR DOORLOCK. Leroy E. Williams, Edgerton, Wis., assignor to Highway Trailer Co., Edgerton, Wis., a corporation of Wisconsin. Application March 24, 1933. Serial No. 662,476. 6 Claims. (Cl. 70-74.)

2. In a refrigerator, in combination, cooperating closure parts including a hinged door and its jamb; locking means comprising cooperating elements on the door and jamb respectively, one of said elements being rotatable into and out of engagement with the other; a shaft carried by one of said cooperating closure parts between the planes of its inner and outer surfaces for rotating the locking element on said closure part into and out of said engagement; a wheel on said shaft adjacent one end thereof; means on said closure part arranged to engage said wheel against rotation of the shaft in the direction for disengagement of said locking elements when the door has been closed, and means operable at will exteriorly of the refrigerator for effecting said disengagement.

2,001,410. AIR CONDITIONING APPARATUS. Charles B. Cook, Los Angeles, Calif. Application April 2, 1934. Serial No. 718,619. Renewed April 12, 1935. 11 Claims. (Cl. 257-9.)

3. In an air conditioning apparatus, a receptacle having a humidifying chamber therein, and having a heat exchange chamber therein, a tank in said air humidifying chamber, said tank having pipes communicating therewith, said pipes passing to said heat exchange chamber, a plurality

of spaced members adapted to be wetted by water in said tank, a blower, an inlet to said blower, means to drive said blower, a passageway extending from said blower, a passageway extending from said blower to said humidifying chamber, a second passageway leading from said blower to said heat exchange chamber, a second duct leading from said heat exchange chamber, said second duct being disposed within and surrounded by said first duct.

2,001,484. SYSTEM FOR TEMPERATURE CONTROL. Henry Holland Buckman, Jacksonville, Fla., assignor to Buckman & Co., Jacksonville, Fla., a corporation of Florida. Application March 14, 1931. Serial No. 522,759. 3 Claims. (Cl. 62-1.)

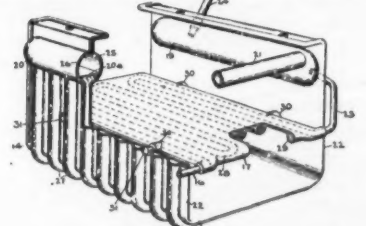
1. In a combined refrigerator and gas generator, a refrigerating unit, a gas generator unit, a common fluid supply means for operating both units, and means for varying the supply of fluid to one of said units independently of the operation of the other of said units.

2,001,522. CENTRIFUGAL BLOWER. Thomas Chester, Detroit, Mich. Application May 3, 1932. Serial No. 608,950. 14 Claims. (Cl. 230-114.)

14. In a blower of the class described and having a rotatable impeller with radially-shallow curved forwardly-inclined blades having their cavities in the direction of impeller rotation and a housing therefor having a volute collector part leading to a discharge mouth, cylindrical mask means disposed in said housing to provide an annular vortex chamber of substantial radial dimension about said impeller, said mask means having port means and being arranged for adjustment thereof to control flow from said vortex chamber to said volute collector part of the housing.

2,001,540. EVAPORATOR FOR REFRIGERATING SYSTEMS. Delbert F. Newman, Schenectady, N. Y., assignor to General Electric Co., a corporation of New York. Application July 1, 1933. Serial No. 678,628. 3 Claims. (Cl. 62-95.)

1. A refrigerating system including a flooded evaporator having a header and a depending refrigerant-circulating portion,



2,001,540

a cast metal shelf secured to said depending portion and having a refrigerant conduit embedded therein, means for circulating liquid refrigerant through said conduit and for then supplying said liquid refrigerant to said evaporator, and means for withdrawing gaseous refrigerant from said header.

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## SERVICE

### Rotary Compressors

By K. M. Newcum

**Editor's Note:** Mr. Newcum's articles constitute a manual of information on present-day refrigeration systems which will add to the service man's knowledge of refrigeration, and which will assist him in meeting specific problems in servicing operations in the field.

Norge and Majestic rotary compressors are described in this instalment.

The first article in the series, which was published in the April 10 issue of the News, dealt with the fundamentals of refrigeration. Inasmuch as refrigeration is really a process of the removal of heat from a given space, these "fundamentals" consist mainly of the terms, definitions, and physical laws which are involved when heat is transferred from one substance or space to another location.

In the second article, appearing April 17, the three principal parts of the refrigeration system—cabinet, evaporator, and condensing unit—were described briefly and the operating cycle of a refrigerator was explained in detail. Also published with this article was the refrigerant pressure-temperature chart and an explanation of service gauges.

Properties which are necessary for a good refrigerant were explained in the third article which appeared in the April 24 issue of the News. The article also gave a detailed comparison of the physical properties and characteristics of the following refriger-

ants: sulphur dioxide, methyl chloride, ethyl chloride, ammonia, and Freon.

The instalments published in the May 1 and May 8 issue dealt with reciprocating compressors and their component parts. The May 1 article described the compressor body assembly, housing assembly, crankshaft and connecting rod assembly, eccentric shaft and connecting rod assembly, piston and piston valve assembly, and discharge valve assemblies.

The May 8 article dealt with different designs of stuffing box seals, operating principles of these seals, methods of servicing seals, compressor flywheels, direct-connected units.

#### 58. Rotary Compressors

Rotary compressors serve the same purpose in the refrigeration system as does the reciprocating compressor, but employs a slightly different method in accomplishing the compression of the gas.

The Norge compressor is a very good example of successful rotary design. It consists of an eccentric type crankshaft enclosed in a circular housing with a free moving sleeve mounted on the eccentric of the crankshaft.

This assembly revolves in a gyratory manner within the compressor housing with the free sleeve usually revolving at a slower rate of speed than the crankshaft. The sleeve does not actually contact the cylinder walls, but depends upon the lubricating oil to effect a gas tight seal, which provides positive displacement on each revolution of the crankshaft and sleeve.

Located in the cylinder walls and opening directly into the cylinder chamber are two gas ports (Fig. 58). The suction port is shown below the blade, while the discharge port is above the blade.

The steel blade which is closely fitted into a slot in the cylinder housing is the same width as the sleeve. It is free moving and is held in constant contact with the sleeve by means of a spring.

Located at the discharge port is a thin reed flapper-type valve, which acts as a check to prevent the compressed gas from backing into the cylinder chamber. Its function is similar to the discharge valve on a reciprocating compressor, but its action does not have to be positive, that is, it does not have to provide a gas tight seal.

Figs. 58 to 62 inclusive illustrate a complete cycle of the compressor. Fig. 58 shows the cylinder full of gas at the start of the compression stroke. Both the suction and discharge ports are closed off by the sleeve. The dis-

charge reed valve is closed. The blade is forced back tightly against the spring.

In Fig. 59, the rollator has started on its path around the cylinder, as it leaves the neutral point (Fig. 58). All the gas in the cylinder is trapped between the sleeve and the cylinder and compression was started.

The compressed gas finds its way to the blade, which by being in contact with the sleeve and the sides of the cylinder, prevent the gas from entering the low pressure area, and the higher pressure gas tends to force the reed away from the discharge port. While this is taking place the space below the blade, and up to the contact point of the sleeve and cylinder, is being filled with heat laden gas from the low pressure side of the system.

Fig. 60 shows the rollator half way around the cylinder, at which point a good part of the high pressure gas has been forced into the discharge port entrance to the condenser. The low pressure area is increasing and collecting more low pressure gas. The blade is at the point on its longest

#### Operating Cycle

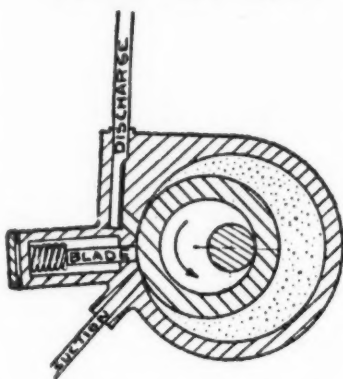


Fig. 58—Norge Rollator cylinder full of gas at start of compression.



Fig. 59—Compression started and beginning of suction stroke.

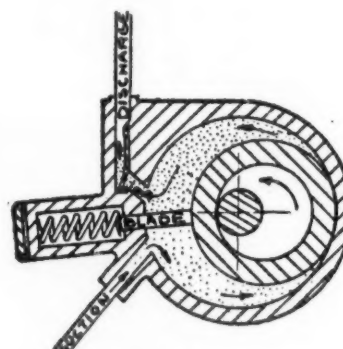


Fig. 60—Discharge and suction strokes half completed.

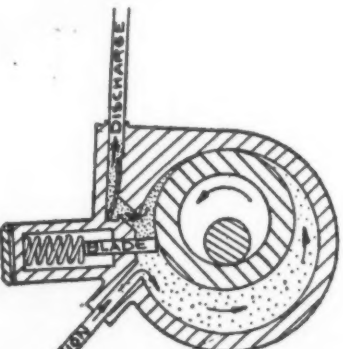


Fig. 61—Discharge valve open on compression stroke.

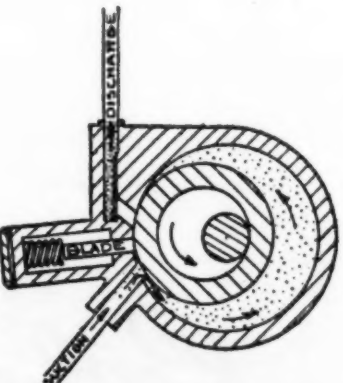


Fig. 62—Discharge and suction strokes completed.

## SERVICE OPERATIONS

A SERIES OF LESSONS OUTLINED FOR THE USE OF THE SERVICE MANAGER IN INSTRUCTING BEGINNERS IN SERVICE WORK

### No. 7—Testing for Sulphur Dioxide Leaks

By K. M. Newcum

#### REASON:

It is absolutely necessary to test for leaks after making any changes in the lines or changing any parts in the refrigerant circuit, as escaping SO<sub>2</sub> gas has a very pungent odor and is suffocating in sufficient quantities.

#### PROCEDURE:

A. Obtain a small bottle of 26 per cent or 28 per cent ammonia from the drug store. (Always see that the bottle stopper is rubber as a cork stopper will soon be eaten away by the ammonia.)

B. Saturate with ammonia a small brush or stick with a piece of cloth wound around the end.

C. Hold the brush, or stick, near the joint to be tested. Hold a flash light behind the joint so that the light will shine on the joint and the ammonia brush. If there is any escaping SO<sub>2</sub> fumes, they will be indicated by a dense white smoke or vapor which is created by the action of the SO<sub>2</sub> fumes with the ammonia fumes. (Do not allow the ammonia to come in contact with the copper or brass parts of the machine as the ammonia will discolor them.)

D. Whether a leak is found or not CHECK WITH INSTRUCTOR.

CAUTION: Do not attempt to repair any leaks without the aid of the instructor.

travel but is still in contact with the spring and sleeve.

In Fig. 61 the discharge stroke is nearly completed and the low pressure gas area has increased. The high pressure gas at this point is passing very rapidly into the discharge port with the same action as the completion of the compression stroke of a piston in the reciprocating compressor.

In Fig. 62 the cycle of the rollator has been completed and has again returned to the neutral position.

The oil level in the Norge is just below the top of the discharge tube. The working parts are submerged in oil at all times.

The Norge seal is of the bellows type and is stationary. It differs largely from the seal on the reciprocating compressor in that it is on the high pressure side of the system (Fig. 63). The seal on the recent models does not use a spring either inside or outside the bellows.

A bushing is interposed between the retaining plate and the inside of the seal, which holds the bellows stretched to a predetermined length. A special bushing is fitted over the shaft, which by using a special composition forms a gas-tight joint between the shoulder and the shaft proper. It is against the outer surface of this bushing that the seal nose rides.

This feature permits the seal assembly to be readily serviced in the event of leaks, by removing the seal, then removing the special bushing from the shaft shoulder, and replacing with new ones. The shaft shoulder in this case does not come in contact with the seal nose, hence is not subjected to wear.

Inasmuch as the rotary compressor does not employ a definite discharge valve and due to the fact that all of the compressor housing is always on the high pressure side of the system, a positive check valve is incorporated in the suction line shutoff valve assembly at the compressor (Fig. 64).

This check valve remains open while the compressor is in operation, and the gas is being drawn into the

compressor. When the compressor stops the high pressure immediately backs up to this check valve which closes. The purpose of the check valve is to prevent this high pressure gas from backing into the evaporator on the off cycle.

The check valve is a thin polished steel disc, held to the ground raised surface of the check valve body with a very thin spring. Immediately ahead of the check valve is a fine wire mesh screen to prevent dirt or scale from lodging under the check valve, which would cause it to leak.

A leaky check valve will cause the

#### Shutoff Valve

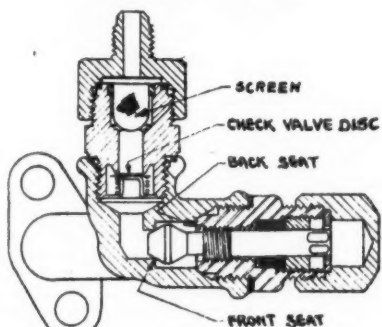


Fig. 65—Suction line shutoff valve (Norge).

compressor to operate on short off cycles, as the warm gas leaking by the check will warm the evaporator and thermostatic control causing the motor to start prematurely.

The check valve may be repaired or replaced by first evacuating the suction line, in the same manner as repairing a piston or discharge valve of the disc type.

The moving parts of the Norge are precision machined and tend to improve in efficiency after they have been in service for a period of time. This is due to the natural lapping

(Continued on Page 21, Column 1)

### Rollator Compressor

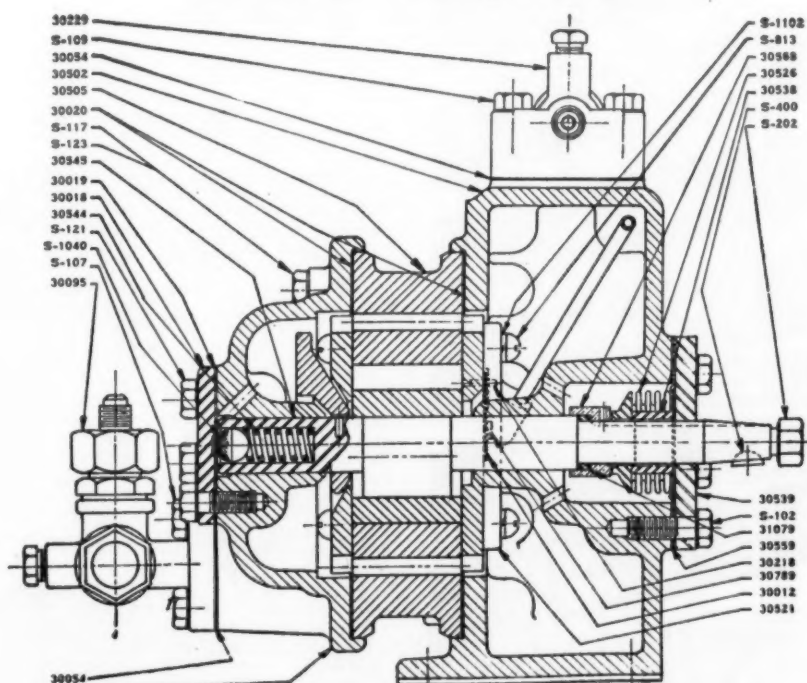


Fig. 63—Cross section view of Norge Rollator compressor.

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Refrigeration and Air Conditioning Institute Training is endorsed by 20 leading manufacturers who have appointed some of their own engineers, to direct and supervise the training, as members of the R.A.C.I. Board of Governors. This board is an actual working body, meeting in regular conferences, with full authority and power to make the training fit the needs of the Refrigeration and Air Conditioning Industry, at all times.

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The Endorsed School

REFRIGERATION AND AIR CONDITIONING INSTITUTE, INC.

2150 Lawrence Ave., Chicago



## Rotary Compressors

(Continued from Page 20, Column 5)  
action of the blade in its housing and against the revolving sleeve.

An inefficient compressor may be due to a small particle of dirt or scale lodging between the blade and any one of its housing surfaces, or at the point of a contact with the sleeve. Should a foreign particle wedge between the side or edge of the blade and the housing the blade may bind or stick, not making proper contact with the sleeve.

If foreign matter finds its way between the face of the blade and the sleeve the contact will also be broken. The blade may be removed for inspection or cleaning. Care should be exercised in removing the blade and its relation to the housing determined, as it must be replaced in the same position as it originally occupied.

Moisture in the system uniting with the SO<sub>2</sub> may also cause the blade to stick, if sulphurous acid is formed. The suction line shutoff valve (Fig. 65) at the compressor is so designed that when back seated, that is, turned all the way to the left, the plug may be removed for inserting the compound gauge.

As the check valve is located between this valve and the suction line proper, the service man is cautioned to put the compressor into operation before turning the valve off its back seat, for if the compressor is idle and the valve opened the pressure from the high pressure side will respond on the gauge and may be in excess of its limits.

A secondary angle valve screwed into the gauge port, with the gauge or gauge connection fitted into its opening, is very helpful in servicing this type of unit.

The Majestic rotary compressor is shown in Fig. 66 and 67. This design incorporates several different features in rotary design. The compressor proper consists of three moving parts, the eccentric type crankshaft, the impeller, and the pump valve. The compressor housing assembly consists of the rear bearing plate, pump body, front bearing plate, housing, seal, seal retaining plate, and gaskets.

The compressor assembly is built up on the cast iron cover plate and the rear bearing plate is then placed in position on the cover plate, and the pump body secured to it with bolts having the heads counter bored in the body.

The methods of assembling the compressor is for the vane to be placed in position and the front bearing plate bolted in place. The oil ring is placed on the shaft and held in place with the ring retainer.

The pump vane, which divides the high and low pressure side during compression, is of revolutionary design in that the cylindrical head of the vane oscillates in a cylindrical slot in the impeller and pistons in a vertical slot in the pump body due to the eccentric motion of the impeller. This design provides positive contact between the impeller and the vane.

The front bearing plate, which is bolted and welded to the pump body, serves as the main bearing of the pump. Oiling of the bearings and pump is accomplished by the oil ring which rides on a portion of the shaft extending through the front bearing plate. The oil is carried through the bearing by two helical grooves cut in the crankshaft.

The oil is then forced through the clearances of the pumps due to a difference in pressure between the pump case and displacement chamber. The oil is then discharged with the compressed gas to the sump at the end of the shaft, where a portion is carried through the rear bearing by two helical grooves to lubricate the bearing and act as a seal for the pump.

## Norge Check Valve

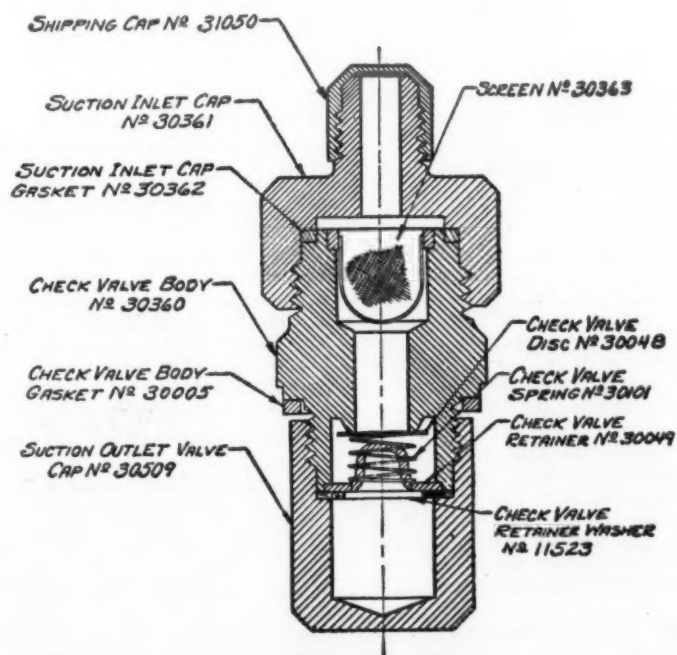


Fig. 64—Norge check valve which is located at suction service valve.

## INSTALLATION OPERATIONS

A SERIES OF LESSONS OUTLINED FOR THE USE OF THE SERVICE MANAGER IN INSTRUCTING BEGINNERS IN INSTALLATION WORK

### No. 7—Refacing a Damaged Flare Seat on a Fitting

By K. M. Newcum

#### TOOLS NEEDED:

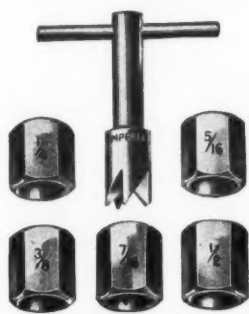
One set of flare refacing tools.

#### MATERIAL NEEDED:

One 1/2-inch double end union (coupling).

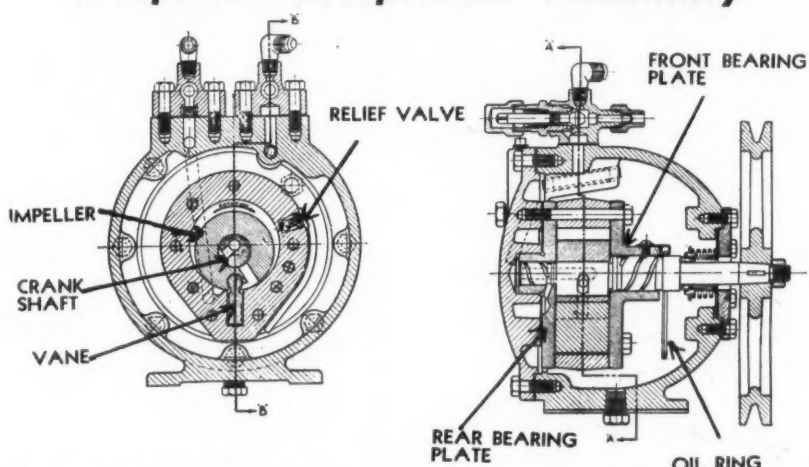
#### PROCEDURE:

1. Place damaged fittings in vice if available; if not available hold fitting with open end or socket wrench.
2. Screw refacing die of proper size, corresponding to the fitting above, onto fitting and tighten securely.
3. Insert refacing tool proper into die.
4. Revolve the refacing tool clockwise, maintaining a slight, even pressure with the tool upon the fitting.
5. Revolve several times, removing tool at regular intervals, and inspect the face of the fitting. (Refacing a fitting is like grinding the valves on a car, when a perfect seat has been effected do not cut any more from the surface.)
6. Remove the cutter and die from the fitting.
7. Check with instructor.

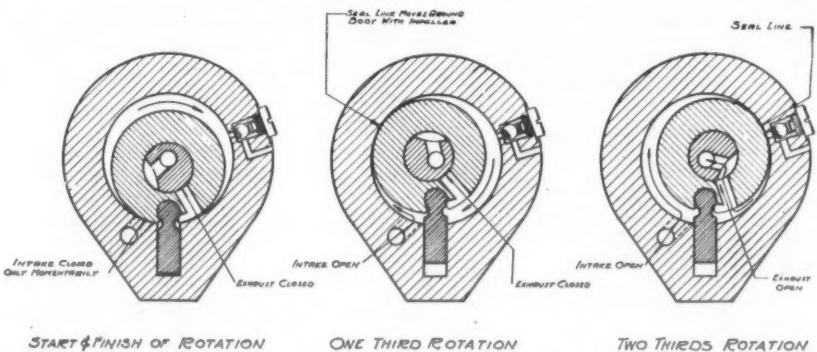


Set of flare refacing tools (Imperial Brass Co., Chicago).

## Majestic Compressor Assembly



Figs. 66 and 67—Compressor assembly of model 50 and 51 standard Majestic compressors.



Figs. 68, 69, and 70—Cycle of compression of Majestic rotary compressors.

The vane is provided with three horizontal grooves toward the discharge side of the compressor. The grooves become filled with oil to effect a gas seal. Two grooves ground diagonally across the outer side of the vane serve as a by-pass connecting the space between the end of the vane and the bottom of the vane slot and the low pressure side of the compressor to prevent oil locking the vane.

Figs. 68, 69, and 70 shows the cycle of the compressor. In Fig. 67 the impeller is in the neutral position and the intake port is closed. The exhaust port is also closed.

In Fig. 69 the impeller has made one third of its rotation, and has moved away from the intake port leaving it open allowing heat laden gas to enter the low pressure chamber, between the vane and the point of contact between the impeller and cylinder wall. The exhaust port is still closed.

In Fig. 70 the compression stroke is nearly completed and the shaft has reached the predetermined angle where the discharge ports open and allow the compressed gas to be forced from the compression chamber through the center of the shaft to a sump in the cover plate. A radial hole drilled in the cover plate conducts the gas to the compressor case, thence

(Concluded on Page 22, Column 3)

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MANUFACTURERS SPECIALIZING IN SERVICE  
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COMMERCIAL EVAPORATORS

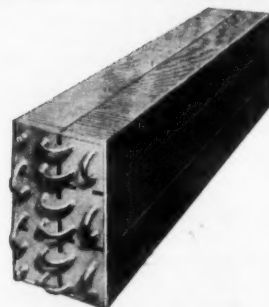
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TYPE KR—  
5 MODELS

## RANCOSTAT

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Stainless  
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Accident-proof! Won't break if dropped—or even if struck a hammer blow! No corrosion in ordinary temperatures. High conductivity of heat and cold prevents accumulation of moisture. Many advantages explained in KR Bulletin. Write for it.

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COMPRESSORS  
FOR HOUSEHOLD REFRIGERATION

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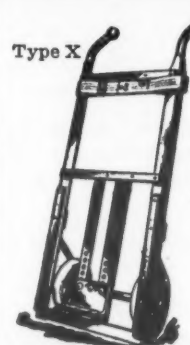
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Deliver your Refrigerators on Rubber  
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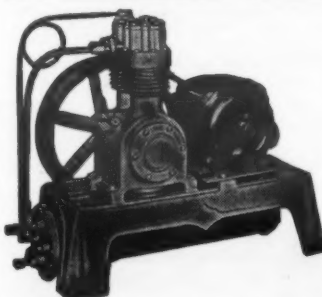
Two sizes—Type X with 53 inch handles and 8 inch rubber wheels—Type Y with 70 inch handles, 8 inch rubber wheels and skids.

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Style EW—Water Cooled  
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STARR FREEZE  
OUTSTANDING PERFORMANCE  
attested by satisfied users  
— EVERYWHERE!

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Write for bulletin on complete line covering refrigerating appliances, liquid line filters, dehydrators, acid neutralizers, standard parts and materials, service tools, shaft seals, bearing metals and parts. Descriptive literature will be gladly furnished on any or all of these lines on request.

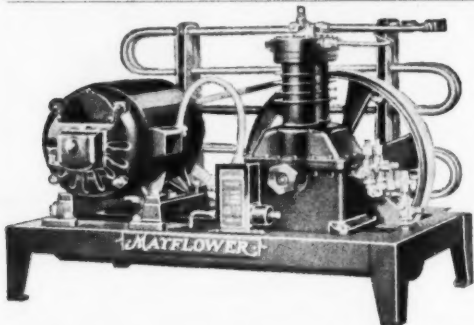
AMERICAN INJECTOR COMPANY 1481-14th Street, Detroit, Mich.



## BUYER'S GUIDE

MANUFACTURERS SPECIALIZING IN SERVICE  
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Minimum Contract for this column—13 insertions in consecutive issues.



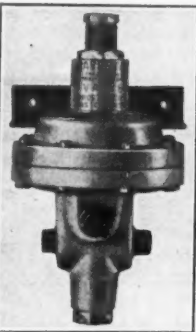
### MAYFLOWER COMMERCIAL

The compressor of Proven  
Quality, Simple in Design,  
Rugged and Economical.

Representation available

Write for details

HARDY MANUFACTURING CO., INC., 100 Davis Ave., Dayton, Ohio



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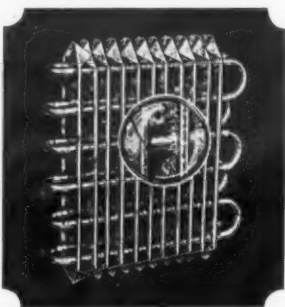
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Compensated Temperature Control

Freon—Methyl Chloride—Sulphur Dioxide

Write for New Bulletin describing Load Compensation

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The Coil with a Permanent Fin Contact

Standard size for every commercial  
application—

Suitable for all refrigerants—  
Greater conductivity, greater efficiency—  
Special sizes for air conditioning.

Write for Complete Data Book

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2821 Montrose Ave. Chicago

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The most convenient, surest and quickest means of detecting  
and locating Halide Gas Leaks in refrigerating units.

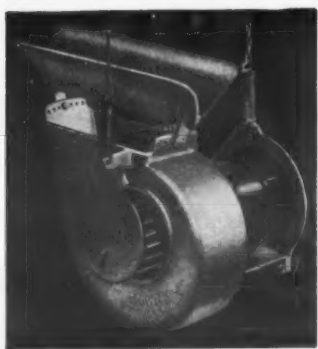
Positive, Instantaneous

... most sensitive and accurate

Improved burner design, "Y" suction tube and non-clogging feed  
valve make the HULL Detector the most efficient for all testing and  
servicing requirements. Recommended and used by manufacturers  
of Halide Refrigerant Gases, equipment manufacturers and engineers  
everywhere. Low first cost and inexpensive operation.

Write for Description and New Low Price

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A diffused air system for Walk-In Coolers. No changes  
required in present set-up. Endorsed by National pack-  
ers, abattoir companies, wholesalers and retailers. Three  
years of successful operation.

Shrinkage is of paramount importance in the meat in-  
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The BROWN Corp.

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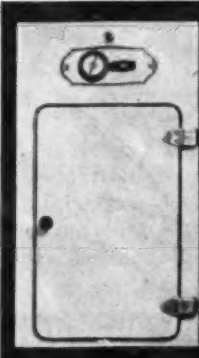
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Manufactured in sizes from 2 to 8  
trays direct expansion type. Ideal  
for the assembler of Household  
Refrigerators or for replacements.

Attractive Prices

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## Majestic Condensing Unit

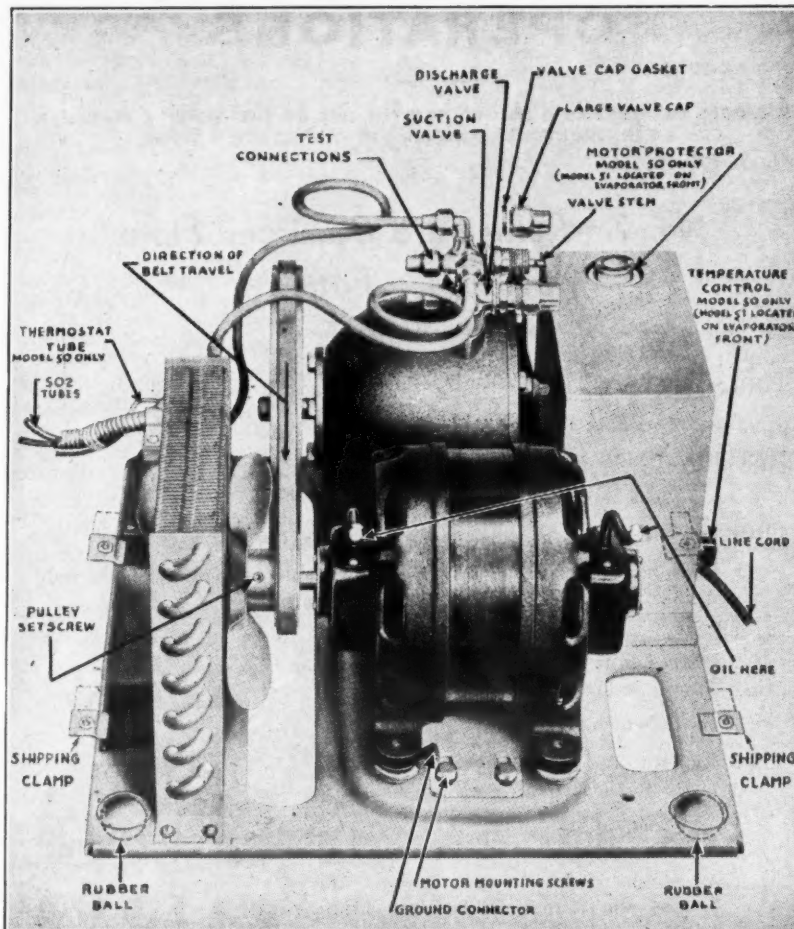


Fig. 72—General view showing compressor and parts of condensing unit on standard Majestic model 50.

### Rotary Compressors

(Concluded from Page 21, Column 3)  
through the discharge valve to the condenser.

A ball type relief valve is illustrated in Fig. 66. The purpose of this relief is to prevent oil or liquid SO<sub>2</sub> from binding the impeller and stopping the compressor, by providing an opening under such unusual conditions, to the compressor sump, below the oil level.

The suction line shutoff valve at the compressor is provided with a check valve to prevent the high pressure gases from entering the evaporator on the off cycle of the compressor.

### Machine & Display Case Makers to Cooperate

HOT SPRINGS, Va.—Plans for closer cooperation between the manufacturers of commercial refrigeration equipment and the makers of commercial display cases were inaugurated here last week, when representatives of Nema, Refrigerating Manufacturers Association, and the Commercial Refrigerator Manufacturers Association set up a joint committee to study common problems.

On the joint committee are Walter Landmesser, of General Electric Co., and A. J. Harlan, Kelvinator Corp., representing the commercial refrigeration section of Nema; J. A. Fernald, Baker Ice Machinery Co., and C. A. Pearson, commercial sales supervisor, York Ice Machinery Corp., representing RMA; and W. C. Whitchee, "Dry-Kold" Refrigerator Co., Niles, Mich., and H. C. Ahrens, C. S. Schmidt Co., Cincinnati.

The meeting, held during the Nema-RMA gatherings here last week, laid the groundwork for a program of co-operative action in working out problems common to all three groups.

General discussion of the problems common to all three groups.

General discussion of the problems was held, but no action was taken other than the appointment of the joint committee to study the situation and suggest a possible program of action later.

It was realized, members said, that there are many problems common to all three groups, and it was with the view toward a mutual working out of these problems that the meeting was held.

### New Type 'Bug' in System Presents a Unique Problem

DALLAS—Discovery of a new kind of "bug" in a commercial refrigerating system to plague service men is claimed by John McKinley, branch manager for General Refrigeration Sales Co. here.

According to Mr. McKinley's story, a Lipman machine was sold in Oklahoma, 175 miles from the distributor's office, and was properly checked before the installing engineer left.

Several days later, the user telephoned that something was radically wrong—the machine would start and stop at irregular intervals, sometimes running only a few second at a time, and then running hours on end.

After considerable discussion over the telephone, the distributor drove 175 miles to the job and a thorough inspection proved everything okay until he took off the cover of the Merco switch, to find an enormous cockroach perched on the mercury tube!

The distributor watched the cockroach's maneuvers for a while and saw the insect walk to the end of the tube, whereby the mercury would flow down and close the circuit; then like a kid on a teeter-totter, he would back up on the other end and break the circuit.

The cockroach was subsequently exterminated, and there have been no more service calls on this job, Mr. McKinley reports.

### Seal Assembly

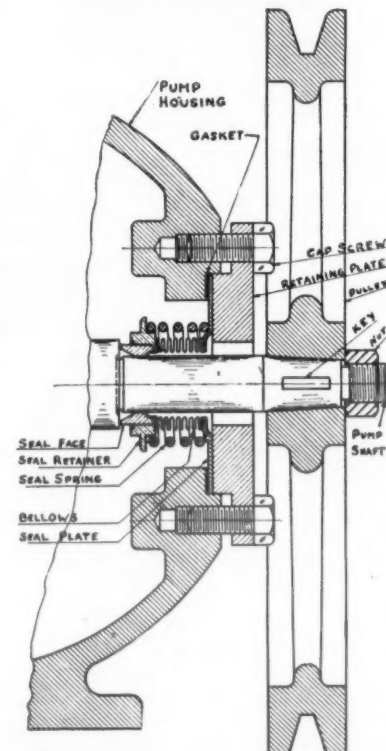


Fig. 71—Majestic seal assembly.

The compressor seal assembly which is on the high pressure side of the system, Fig. 70, is of the bellows type with the outside spring. It is stationary and the seal nose rides on a shoulder on the shaft.

### Special Truck Delivers Kelvinators in Detroit

DETROIT—Accommodating 12 refrigerators, a special Dodge delivery unit is used for distributing Kelvinator refrigerators in Detroit. The chassis of the truck is the 1½-ton Dodge; the body was designed by George F. Provic, who operates the Overland Express Co. of Detroit and handles Kelvinator deliveries under contract.

Skirting and side panels of the truck are of steel. Cover plates over the rear wheels are held by thumb screws for quick removal. In addition to the tail gate there is a door on the curb side. The unit is 13 ft. 6 in. long and the inside height is 63 in. The top rails are chromium-plated. A tarpaulin is carried for weather protection.

## Sampson Electric Co. Uses Card System to Record Service Data

CHICAGO—Customers of the Sampson Electric Co., Norge distributor here, get prompt and efficient attention to their requests for service, thanks to the simple but highly effective record system recently installed by John A. Carlson, service manager for the Sampson Co.

Complete information concerning every installation is compactly assembled and made so readily available that within two or three seconds—while the customer is still telling his troubles over the telephone—the operator has before him the street address, date of sale, the date guarantee expires, type of machine, serial number, and other pertinent facts such as whether the caller is tenant or owner and, if a tenant, whether the building agents must O.K. the service call.

Incidentally, if the "free service" period has expired so that there is to be a charge for the call, the same record tells whether it must be on a C. O. D. basis or not.

Mr. Carlson adapted for his purpose record equipment such as is used by department stores for credit control. A revolving stand with flexoline strips in frames was purchased from the Acme Card System Co. and all existing records were boiled down and transferred to the new equipment.

"The new system is worth all the time and expense it required," says Mr. Carlson. "Not only do we speed up the handling of all service calls by about 50 per cent, but we can handle them to better advantage."

"If we have to make a charge for the call because the guarantee period has expired, we are able to tell the customer immediately when he calls. If we have to get an O.K. from some building agent or get a written purchase order as in the case of a great many installations in apartment buildings, we know that fact instantly and do not have to lose any time."

The new record installation requires less than one-fourth as much room as the old one, says Mr. Carlson. The revolving stand holds panels which will contain complete necessary data on more than 50,000 installations.

### Refrigerant Hazards Are Minimized by Bureau

(Concluded from Page 1, Column 2)

"Precautionary safeguards are provided also by law. Under the terms of a Milwaukee ordinance adopted June 2, 1930, domestic refrigerator systems can be sold or installed only after they have obtained the approval of the Inspector of Buildings and the Commissioner of Health. These authorities declare that modern refrigerators are safe.

"Refrigerators sold in Milwaukee currently and in recent times employ refrigerants as follows:

Sulphur dioxide .....	13
Methyl chloride .....	4
Aqua-ammonia .....	3
Dichlorodifluoromethane .....	2

"The average amount of refrigerants used is 1½ pounds. In no case is as much as 5 pounds of refrigerant used in any self-contained refrigerating unit sold in Milwaukee.

"Sulphur dioxide, the most commonly used, is irritating and offensive to humans but no lasting harm is known to arise from exposure to it. Furthermore, because of the offensiveness of minute quantities of this gas, slight leaks are discovered promptly.

"Methyl chloride is not toxic or harmful—it acts as an anaesthetic but only when present in the air in quantities of more than 10 per cent by volume. Any leak could hardly remain undiscovered for long because it is required by law that this odorless gas be made odorless.

"Ammonia refrigerants have caused accidents in past years, notably in large multiple and commercial installations but this was before the perfection that has been developed in mechanical construction.

Dichlorodifluoromethane is non-toxic and non-irritating and not dangerous. None of the four refrigerants named is flammable or explosive except ammonia, which is flammable only under unusual conditions.

"The Better Business Bureau, after a careful survey and study of authoritative sources, concludes that any artificial refrigerant currently in use could constitute a hazard to health and safety only under the most extreme and unusual conditions."

### Melchior Will Export 'Ermostat' Controls

PHILADELPHIA—Melchior, Armstrong, Dessau Co. has been appointed Eastern United States and foreign countries' distributor for the "Ermostat," a motor overload protector designed for use on electric refrigeration motors. The Ermostat is manufactured by Electric Refrigeration Motor Co., Inc.





## PEERLESS THERMAL EXPANSION VALVES

for Methyl Chloride, Sulphur Dioxide, Freon, and Ammonia

1. No bellows to leak.
2. No possibility of moisture condensation interfering with valve action.
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**PEERLESS ICE MACHINE CO.**  
CHICAGO TWO FACTORIES NEW YORK  
515 W. 35th St. 43-00 36th St., L.I.C.

## QUESTIONS

### Pulley Makers

No. 2260 (Distributor, Iowa)—"We would like to get in touch with manufacturers, who specialize in making pulleys, both with and without fans, for refrigeration use."

"We have written all the manufacturers listed in your 1935 directory, but cannot locate a manufacturer who supplies a complete line of these pulleys."

Answer: Try the following:  
Central Die Casting & Mfg. Co., Inc.  
2937 West 47th St., Chicago, Ill.  
Meyer-Foley Co., Inc.  
202 S. Chambers, Galesburg, Ill.  
Adrian Foundry & Machine Co.  
Adrian, Mich.  
American Pulley Co.  
4214 Wissahicken Ave., Philadelphia, Pa.

### Excelsior Refrigerating Co.

No. 2261 (Lawyer, New York)—"I would appreciate it very much if you could see fit to furnish me the following information with regard to the Excelsior Refrigerating Co. of New York and Excelsior Brewery, Inc., of New York:

"1. Whether either or both of the said companies are still in business and at what address.

"2. Who are the members or officers of either or both of the said companies.

"3. The nature and extent of either or both of said companies.

"4. If either of the said firms has ceased to do business, let me know at what time they so ceased to do business and who, if anyone, was the dissolving or liquidating assignee or trustee."

Answer: We have no record of the Excelsior Refrigerating Co. of New York, or the Excelsior Brewery, Inc.

The Excelsior Motor Mfg. & Supply Co. of 3701 Cortland St., Chicago, Ill., at one time manufactured refrigeration equipment, but the refrigeration division of this company was absorbed by the Carbondale Machine Corp., of Harrison, N. J.

### Book on Air Conditioning

No. 2262 (Distributor, Colorado)—"Can you give me the correct address of the firm of publishers who handle the book called 'Air Conditioning' by an author named Davis? I understand this is published by Engineering Publications of Chicago but a letter addressed to them was returned for lack of better address."

Answer: We believe that you must have in mind "Air Conditioning for Comfort," by Samuel R. Lewis, published by Domestic Engineering Publications, 1900 Prairie Ave., Chicago, Ill. This company was formerly called Engineering Publications, Inc.

### New Service School

No. 2263 (Reader, Maryland)—"Having enrolled for a course in Electric & Air Conditioning Refrigeration with the Utilities Instruction Laboratories, Philadelphia, Pa., I wish to know if the company is of good standing. If they are not please notify me at once, giving a company of good honest standing. I have been told that there is a group of fake companies taking enrollments for this course in and around Hagerstown."

Answer: We have no information regarding the above-mentioned school.

### Parts for Holmes Units

No. 2264 (Dealer, Ohio)—"Being a subscriber to your paper we are writing you for information much needed in our service department."

"We are seeking one set compressor gaskets and one set fin rollers for a Holmes refrigerator model H55-7315."

"We would appreciate your either sending this letter to the company that makes these parts, or sending us the information direct and greatly oblige."

Answer: See below.

No. 2265 (Dealer, Pennsylvania)—"As a subscriber, I am asking you if you can give me information where we can buy repair parts for the Holmes refrigerator."

Answer: Holmes Products, Inc., which formerly manufactured the Holmes refrigerator, has been out of business for several years, and we know of no company manufacturing parts for these refrigerators.

However, we suggest that you write to the following companies, stating your needs: The Harry Alter Co., 1728 S. Michigan Ave., Chicago, Ill.; Melchior, Armstrong, Dessau Co., 300 Fourth Ave., New York City; Utilities Engineering Sales Co., 410 N. Wells St., Chicago, Ill.; Iceless Refrigeration Accessories Co., 2401 Chestnut St., Philadelphia, Pa.; William M. Orr Co., 1223 Brighton Road, Pittsburgh, Pa.; H. W. Blythe Co., 2334 S. Michigan Ave., Chicago, Ill.; Carl John Stein Co., 122 W. Illinois St., Chicago, Ill.;

McIntire Connector Co., Newark, N. J.; and Refrigeration Service, Inc., 3109 Beverly Blvd., Los Angeles, Calif. These companies are all large jobbers of refrigeration parts and some one of them may have a stock of parts for Holmes refrigerators.

### Service Tools

No. 2266 (Service Firm, Iowa)—"Can you place us in contact with manufacturers of refrigeration service men's tools?"

Answer: Manufacturers of various types of refrigeration service tools are listed on pages 332, 333, 334, and 336 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY.

### 1935 Directory

No. 2267 (Service Firm, Pennsylvania)—"We understand that you publish a magazine and also a catalog containing advertisements of the different refrigeration parts and unit manufacturers. As we are interested in this and also in knowing just what concerns can fill our needs in the replacement parts line, we would like to have complete details from you on just what you have to offer."

Answer: The 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY lists all manufacturers of refrigeration and air-conditioning equipment, parts, materials, supplies, and accessories.

It also contains a section listing concerns which specialize in supplying all types of refrigeration replacement parts. A number of the larger supply houses have advertisements in this section showing the types of parts which they are in position to furnish.

The price of the DIRECTORY is \$3.00. See subscription coupon on this page.

### Refrigeration Controls

No. 2268 (Exporter, New York)—"One of our customers in Sydney, Australia, has requested us to send them catalogs and best export prices on refrigeration controls; such as, thermostats, high pressure cut-outs, temperature and pressure controls, etc."

"We feel quite sure that you will be in a position to put us in touch with responsible manufacturers of these products and if you will give us the names and addresses of the most likely firms, we shall be very glad to mention your name when writing them for the information desired."

Answer: The following companies manufacture refrigeration controls of the types in which you are interested: Allen-Bradley Co.

1325 South First St., Milwaukee, Wis.  
Automatic Reclosing Circuit Breaker Co.  
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### Evaporators

No. 2269 (Manufacturer, Pennsylvania)—"Can you advise us to what extent frosters are made by the refrigerator manufacturers themselves, or whether these manufacturers purchase their evaporators from other people? If the latter, about how many manufacturers of evaporators are there in the United States?"

Answer: According to specifications published in the March 20 issue of ELECTRIC REFRIGERATION NEWS, 18 of the 37 manufacturers of household electric refrigerators who returned information manufacture their own evaporators, while the remaining 19 use evaporators manufactured by outside companies.

### Manufacturers

No. 2270 (Finance Company, Michigan)—"I would like to have a list of names and addresses of all the companies in the United States manufacturing electric refrigerators. It has occurred to me that you undoubtedly will have this information easily available."

Answer: Manufacturers of household electric refrigerators are listed on pages 235 and 248 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY. The DIRECTORY lists all manufacturers of refrigeration and air-conditioning equipment, parts, materials, supplies, and accessories.

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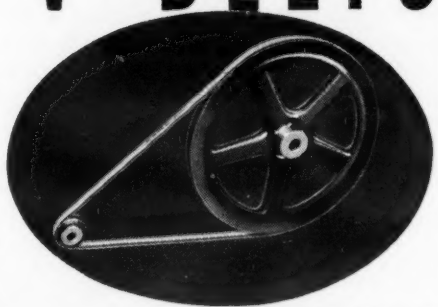


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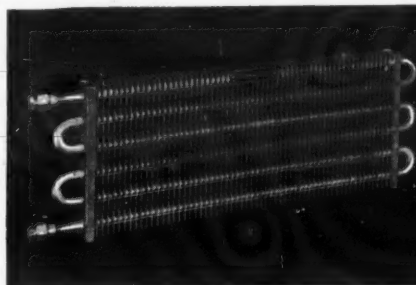
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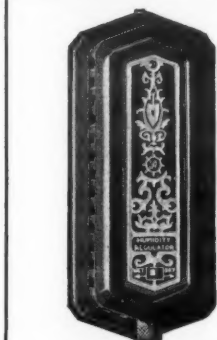
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